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THE BUSINESS OF TRANSPORTATION BY WATER

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Your Guide To this Issue

Does Not Fit

GOVERNMENT operation of ships is inefficient and wasteful. Inititative and enterprise is deadened. Why not instead encourage private operation. Coastwise and intercoastal traffic shows what can be done.

See Page 15

Cut the Red Tape

RECORDS are necessary for orderly procedure. But shipping is overburdened with a staggering volume of paper work due to governmental red tape. Why not try to eliminate some of it?

See Page 17

River Terminals

A WATERWAY, a terminal and a boat are the three elements, in order of their importance, necessary for successful transportation by water. Efficient river terminals are needed.

See Page 21

Lake Ship Design

THE startling suggestion is made that reversion to simpler design and no accessories is the only way to cut operating costs to offset reduced revenue due to low water on the Great Lakes.

See Page 25

Ship Libraries

IF THE human element is neglected, mechanical perfection means nothing. Books add to the contentment of the man on board ship. Free libraries are distributed to American vessels.

See Page 28

Launch Malolo

EVERY man connected with the building of this superb ocean liner has reason to feel proud of the excellent workmanship evident from her fine appearance. The launching was a notable event.

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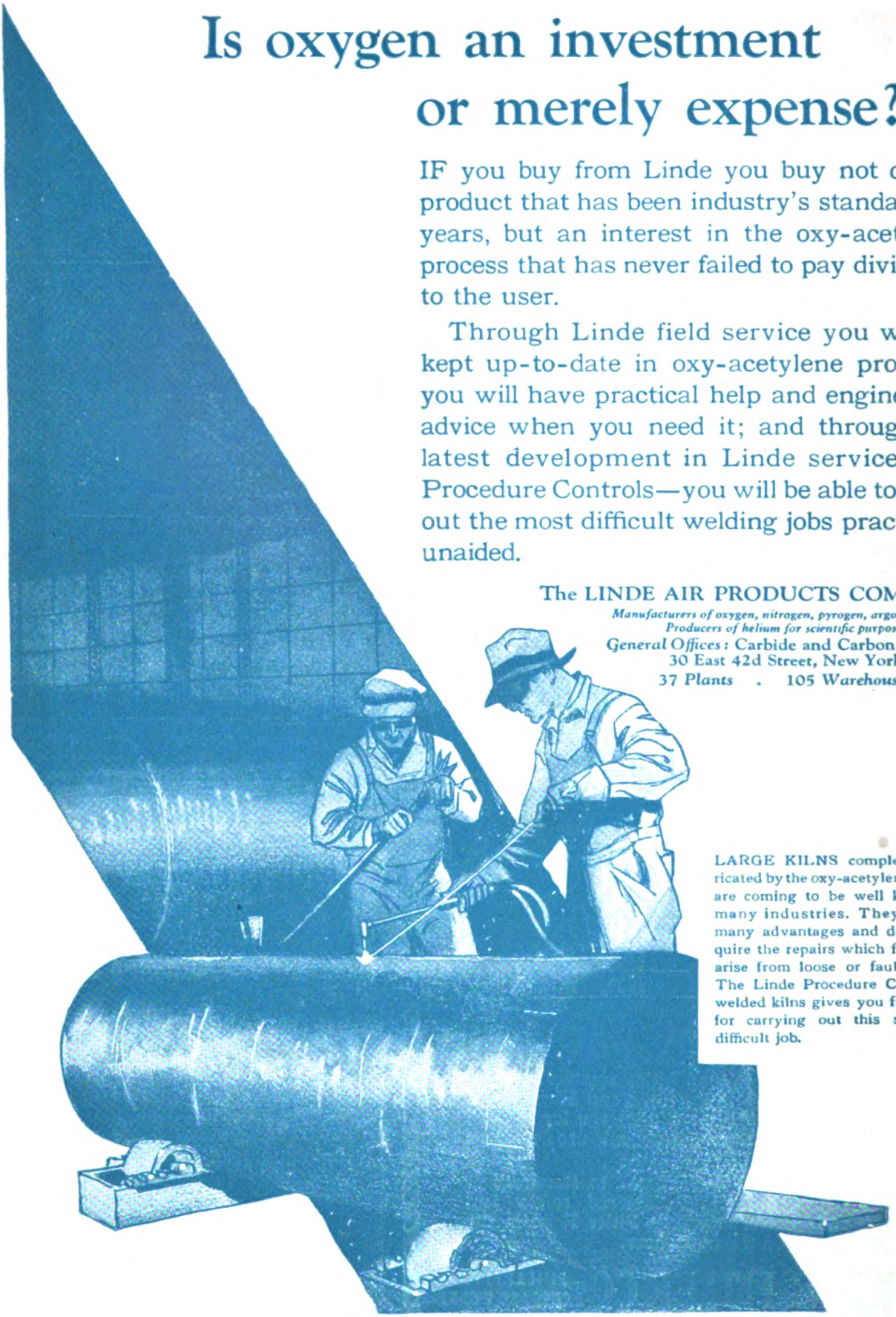

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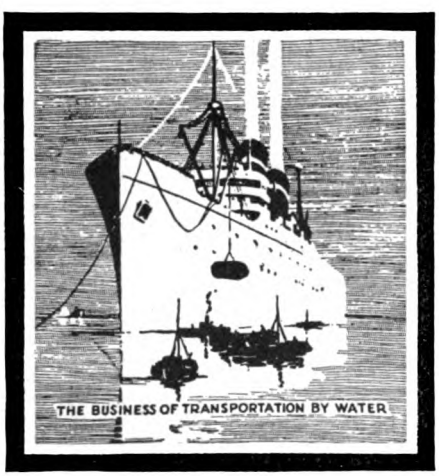
FOUNDED 1878



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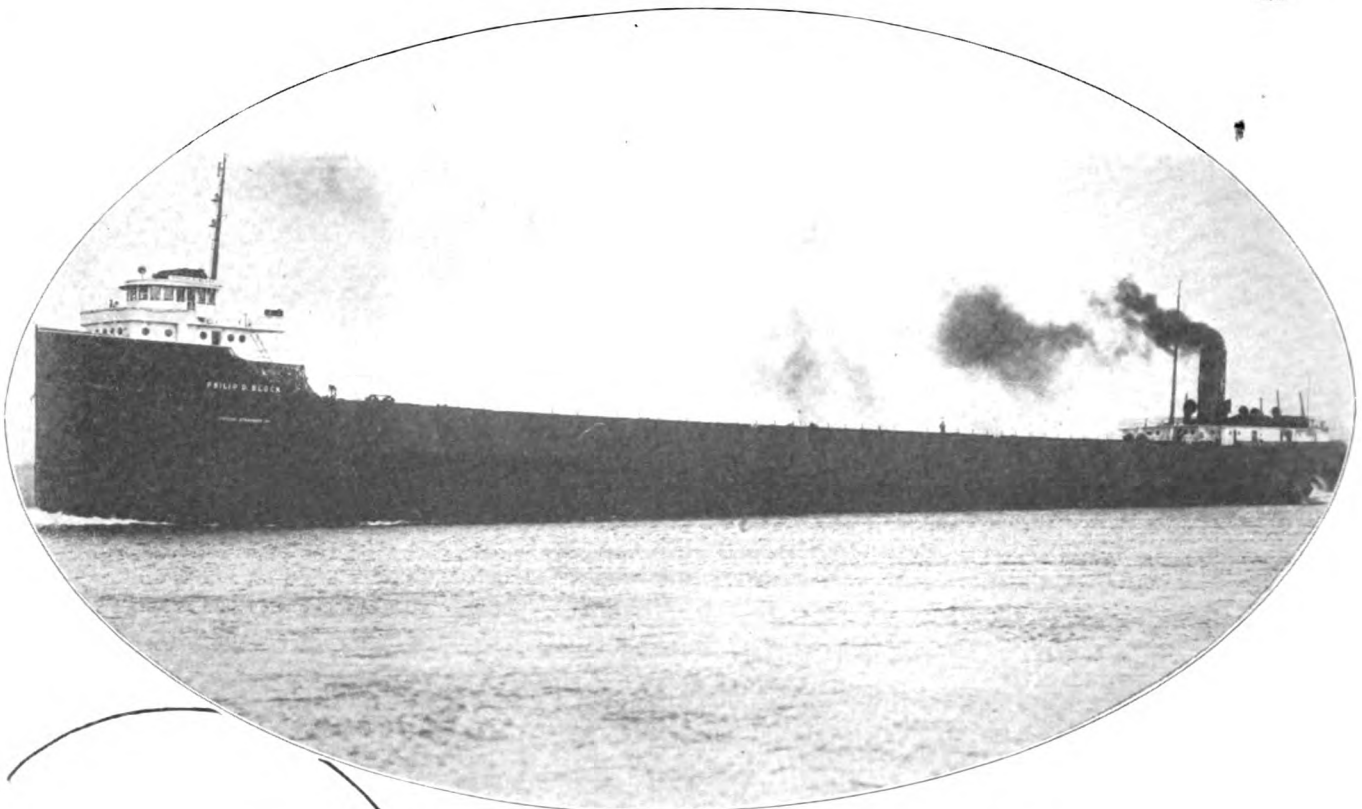

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The American Com

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Congress Can Reach No Agreement on Merchant Marine

THE inaction of congress in dealing with the major question of establishing a real merchant marine policy is inexcusable. The shipping board is allowed to drift along in its wasteful and inefficient way defying all authority and direction. Barely a start was made on the shipping bills before the house committee, while the senate commerce committee failed even to make a definite start on the problems outlined in the several reorganization bills that were placed before it. Further progress is not looked for in this session. Like a number of other questions before congress, the shipping question, with its regional port jealousies, was found to be too much of a controversial morsel for digestion with the congressional campaign just around the corner. Some views are that a start has been made, and that with some encouragement from business interests and others who want to see a reorganization of the government shipping bureaucracies, adequate shipping legislation may be developed between December and March 4, next. Hearings before the house merchant marine and fisheries committee on the Bacon, Lehlbach and Colton bills for reorganization of the shipping board and Fleet corporation, with a view to getting the government fleet into private operation, have been terminated officially.

Reprinted from the *Philadelphia Evening Public Ledger.*

The subcommittee also has been engaged in drafting a reorganization bill, using material from each of the three bills, to be submitted to the whole committee, but no intention is indicated of pressing for action in any proposed legislation along the lines urged by President Coolidge in two messages to congress, based on the administration's own investigations and the recommendations set forth by representatives of business, shipping and agricultural interests throughout the country at the national merchant marine conference in Washington some time ago. The opposition to divorcing the shipping board from the Fleet corporation and for operation of the government merchant marine by practically one head, grew considerably as the hearings before the house committee progressed with the result that congress was not inclined to press for any legislation.

Several witnesses before this subcommittee early in April presented the other side of the picture, in which many groups of business and agricultural interests throughout the country were shown to be behind a strong sentiment for reorganization of the board, with regional shipping councils to represent various parts of the country. J. H. Gardner, vice president of the New England Steamship Co., declared that the Bacon bill followed in the main the recommendations not only of the shipping men but of the general business interests of the country. Providing as it does a single operating head for the government owned fleet and the establishment of essential trade routes under direct supervision of a board where all sections of the country have representation, the bill without doubt, he said, would go a long way toward solving our present difficulties with regard to the administration of government owned shipping. He pointed out that none of the steamship owners, operators, ship builders or repair yards have been brought before the committee to present their views on the subject, although the American Steamship Owners association, the Pacific Steamship Owners association, and the Ship Owners association of the Pacific, after an exhaustive study of the problems concerning the American merchant marine, prepared a report in May, last

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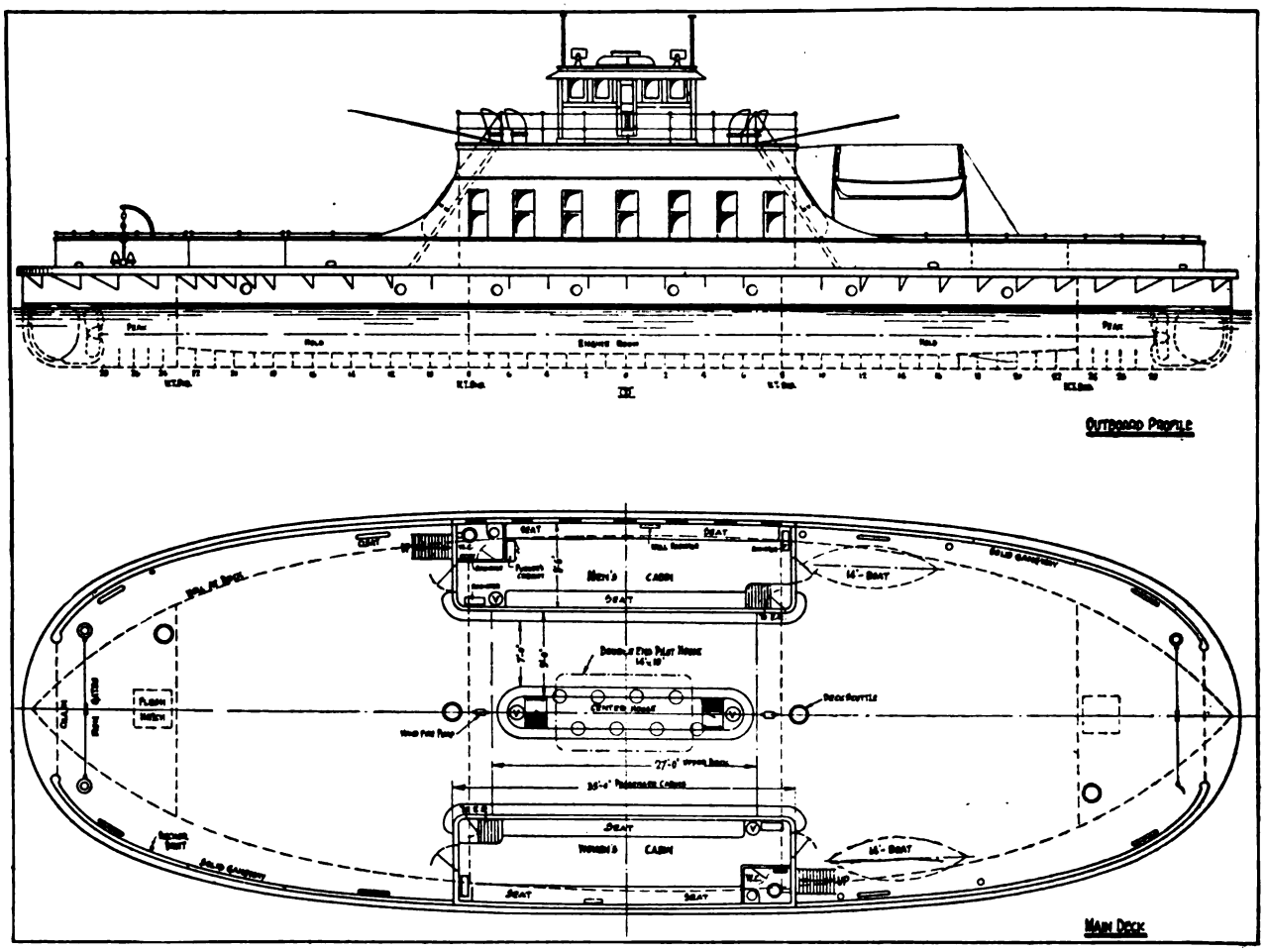
year, indicating recommendations following closely the bill now before the committee.

The conference report on the independent offices appropriation bill, carrying $13,900,000 for the expenses of the Fleet corporation and to cover operating losses for the next fiscal year has been approved. The bill also provides a fund of $10,000,000 for use by the shipping board, with the approval of the President of the United States, for operation of shipping lines taken back from purchasers, when foreign competition is such that the latter is found necessary. The appropriation of $13,900,000 was the amount originally recommended by President Coolidge.

In the meantime and until next congress meets the shipping board will continue operating government owned ships as a political organization. Though individually the members of the board may be honest capable men it stands to reason that no business can be efficiently conducted by so large a body each with equal authority and without responsibility to the executive branch of the government.

All right thinking Americans are anxious to build up a merchant marine and it would be folly for the government to withdraw all of its ships at once. But a policy should be agreed upon by congress which would effectively foster a merchant marine and then the President as the chief executive should be clothed with the authority to carry out such a policy without let or hindrance. As it is now there is neither rhyme nor reason, and there is unnecessary and colossal waste of public money, in the method pursued by the board. And it would apply to any board so constituted exercising the authority it does. The sooner we are rid of this sort of management the better for a real American merchant marine.

Use Diesel Ferry for St. Lawrence Service



THE double ended steel ferry Elmer W. Jones illustrated herewith in profile and deck plan was built by the New London Ship & Engine Co., Groton, Conn. from designs by Eads Johnson, New York City, for the Brockville & Morristown Transportation Co. She is 126 feet long overall, 125 feet between perpendiculars, 37 feet wide and 10 feet deep. The draft is 6 feet, the gross tonnage is 263 and the displacement is 244 tons. Passenger capacity is 250 and the speed is 12 miles per hour.

A 6-cylinder 4-cycle mechanical injection diesel engine of 300 horsepower at 260 revolutions per minute built by the New London Ship & Engine Co. furnishes the main motive power for driving a propeller at each end. There is one auxiliary gasoline engine of 5 horsepower of Palmer make. The electric generator is of Delco type. The fire and bilge pump was supplied by the Gould Mfg. Co.

This ferry is operated on the St. Lawrence river between Brockville, Canada and Morristown, N. Y. and will be in service during the summer season extending from May 1 to Dec. 1. There is a large tourist travel across the St. Lawrence at these points and with this vessel's capacity of 32 vehicles and 250 passengers, excellent ferry service is offered.

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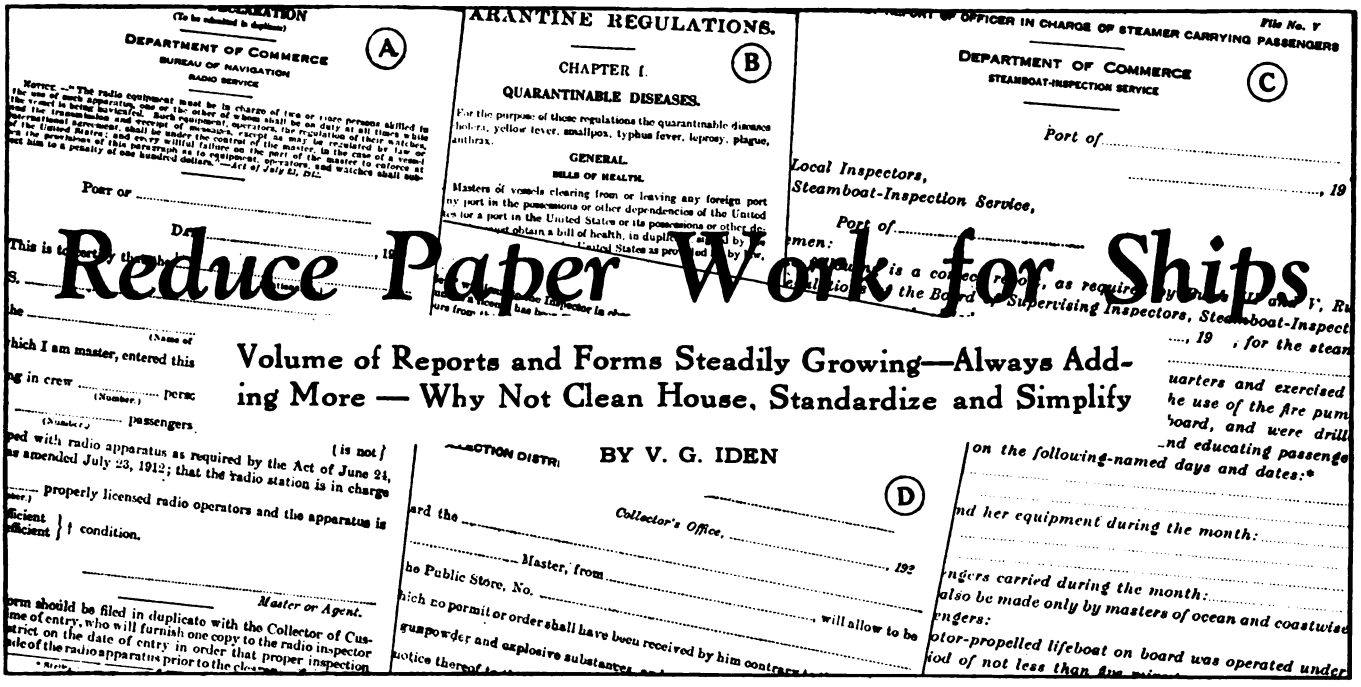

Reduce Paper Work for Ships

Volume of Reports and Forms Steadily Growing—Always Adding More — Why Not Clean House, Standardize and Simplify

BY V. G. IDEN

TO THE ordinary passenger entering an American port via water, the efficiency of the federal inspection is very marked. To the ordinary shipper of cargo by this same means of transportation the inspection becomes extremely irksome at times. As a matter of fact the rules and regulations interposed by one or another of the agencies of the government, federal, state and municipal, are not infrequently downright burdensome and actually prohibitive to a casual importer who may through ignorance run foul of the regulations. The laws require a certain duty to be levied upon imports, permits the imposition of rules which would prohibit the importation of persons or commodities which might spread disease or pestilence, and restricts the entrance of aliens. The laws may be simple enough in themselves and readily understandable but the regulations issued thereunder complicate the business of importation and of personal entry to such an extent that a law practice has grown up which specializes in the interpretation of their application.

Letter of the Law Upheld

It is useless for Americans to be blind to this fact any longer. They may laugh at some of the lurid stories printed in the metropolitan newspapers which deal with incongruities of entry, the exclusion of those admitting moral turpitude and the catching of stowaways; others may brag of the efficiency which checks the importation of an Asiatic plague but permits the entry of Spanish influenza. Much depends upon the point of view, but any honest examination of the inspection made of vessels entering American ports will readily enough convince one of the magnitude of the red tape and the inadequacy of the results obtained thereby.

Simplified Practice

Laws and regulations affecting the business of shipping have been in the making in America beginning with the first maritime ventures of the Colonies under British rule. Since independence one congress after another added its bit to the crazy-quilt of legislation which now exists to test the patience, interpretive qualities and staying powers of American operators.

We have heard from an able executive of the present government a great deal about standardization and simplified practice to eliminate waste and to increase the efficiency of industry. Some study is being made to apply such methods in shipbuilding. Wouldn't it be distinctly worth while to make a comprehensive analysis of all government rules, regulations and official forms affecting the movement of ships in order to coordinate, simplify and eliminate some of this enormous burden of paper work and to clarify the laws so that the conscientious operator would know exactly what he should do to obey them?

The efforts made to carry out the spirit of the laws are of sufficient magnitude to accomplish all the good intended by the framers of those laws but this does not go far. The miles of reports required of the ships entering contain about everything that any human being would desire. But it is plain that the very magnitude of the reports is a burden in itself, requiring the services of an expert staff of pursers to compile and legal brain of a trained lawyer to interpret once they have been filed. Steamship companies regularly plying in services between American and foreign ports are compelled to maintain a regular staff of pursers, trained clerks and statisticians who are not infrequently required to go through an intensive training before they are competent to be sent aboard to serve a ship.

Many Rules and Regulations

As an indication of the burdensome regulations imposed by the various branches of the government we will cite the very first documents required of a vessel. If American-built the commissioner of navigation in Washington must first give her an official number and signal letters before she is commissioned. There are then certain marine documents required, but previous to issuing those the vessel must have a certificate of survey. Then is required the services of the steamboat inspection. This is another branch of the department of commerce which requires the ship to file at the port of entry monthly a report stating compliance with the safety-at-sea act which regulates boat drill and other similar tests.

Marine documents themselves consist of certificates of registry, enrollments and licenses. In addition to these, sea letters and passports for vessels in time of war may be issued through the collectors of customs upon application to registered

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vessels engaged in the foreign trade as an additional protection and evidence of nationality. Sea letters and passports when issued are in all cases surrendered with the certificate of registry at the expiration of the voyage.

Law Difficult to Interpret

Under the law a vessel is required to report when returning to her home port all the fees and charges assessed against her abroad. This gives the federal government an accurate check upon the treatment received by an American ship in the ports of a friendly nation. Now that immigration has been restricted and the law considerably modified in that regard a ship bringing passengers to the United States is subjected to no end of regulation and inspection. Many of the regulations issued on this score are confidential and not even the steamship lines are themselves fully acquainted therewith. Regulations are not infrequently sent in confidence to the American consular agents abroad who vise the passports of all foreigners who are planning to come to the United States. The consular agents endeavor to refuse vises except to the quota which are currently permissible during the particular month. The rigid inspection maintained through the consular agents abroad and the immigration inspectors at the port of entry is intended to prevent any imagined irregularities on the part of the steamship company. This is done because of the many efforts made to smuggle aliens into the United States either over the quota, or aliens who are physically, morally or mentally inadmissible. The steamship company is supposed not to sell transportation to aliens who do not comply with the immigration laws of the United States.

Aliens are required to make application to enter and to re-enter the United States. Application forms are supplied by the United States government. As to the other phases of regulation and inspection on this score, the bureau of immigration maintains a dignified silence.

"The regulations of the department," rules the commissioner general, "forbid the furnishing of information from (or copies of) the records of the immigration service to others than persons having an official connection with the department. Applications of persons having personal, material interest in the subject matter of official records should be accompanied by an affidavit setting forth the interest of the applicant and showing the reason why, and the purpose for which, the copies are desired. Copies of official records desired by or on behalf of parties to cases pending in any court may be furnished to the court upon an order or a rule of the court requesting the secretary to furnish the same, and then only when the production of such copies will not, in the judgment of the secretary, be prejudicial to the government or the public interest.

"The immigration service does not supply alien residents with evidence of their legal admission; nor does it issue receipts showing payment of head tax. The records at the various ports of entry show whether compliance with the immigration laws, including payment of head tax, has been made."

This spirit of secrecy at times works no small hardship upon the steamship. This is manifestly so inasmuch as it happens that if any would-be immigrant is rejected the steamship must export the rejected one and run the chance of having a fine to pay in addition. Somewhat the same situation exists in regard to the crew if the ship be under a foreign flag. All the members of the crew must be accounted for when leaving an American port, for a deserting seaman may come within the prohibitions of the immigration law.

Now the purser's staff of ships entering American ports must be fully alive to all the immigration restrictions. It is supposed to maintain a careful check over the passengers aboard and be mindful of the fact that each of the passengers must have the requisite documents required under the American laws. While it is manifestly the duty of the passenger to fortify himself with the necessary papers to comply with the law and the regulations thereunder, the steamship endeavors to avoid trouble by standing sponsor in many instances.

Just as the alien is required to have the vise of the American consular agent abroad, so must the ship have her documents from the same agent. This includes the bill of health to be filed in duplicate, as well as the certificate of fees. The bill of health gives the usual data regarding the ship assuring her identification, and stipulated facts regarding her lay in port and length of stay, to what extent she was in communication with shore, the time she was in port, sanitary conditions of the vessel, and the diseases prevailing at the port and in the vicinity. The consular agent must attest that the ship has complied with the quarantine rules and regulations. These provide for fumigation and other preventatives where plagues exist. Fumigations may be extended for six-month periods for vessels regularly plying between ports not infected with plague and for vessels whose construction does not favor the harborage of rats.

The bill of health is for the information of the public health officer who boards the ship at quarantine, which is the first stop made by a ship entering an American port. In addition the boarding officer may inspect the passengers and the crew and accommodations provided for each. Any passenger or member of the crew found suffering with any plague may be removed to a quarantine hospital and the remainder of the ship with passengers and crew aboard may be held under quarantine until all danger of spread of the disease is dissipated.

Must Keep Voluminous Records

To the ordinary passenger the compliance with these regulations are comparatively simple but that impression prevails because the passenger is witness only to the boarding of the quarantine officer and is totally unacquainted with the tremendous amount of paper work required in the preparation for the boarding at quarantine. While the ship's doctor is normally responsible for the observance of these rules and regulations it may happen that to effect a strict observance of the law also requires no little assistance from the purser's staff.

Following the departure of the

(*Continued on Page* 42)

To Identify Forms

See Pages 17 and 19

A—Radio Declaration

B—Quarantine Regulations—Bill of health

C—Steamboat Inspection Service—Monthly report of officer in charge of steamer carrying passengers

D—"General Order"—To send unpermitted packages from wharf to public stores.

E—Baggage Declaration and Entry—Treasury department

F—United States Customs Service—Application and permit to allow unpermitted cargo to remain upon wharf.

G—General Application and Permit—To lade or unlade, received from the United States customs service

H—Cargo and Passenger Report Vessels entering United States ports

K—List of Passengers

L—Master's Oath—On entry of vessel from a foreign port

M—Report and Manifest—Compagnie Generale Transatlantique

N—Report and Manifest—United Fruit Co., steamship service

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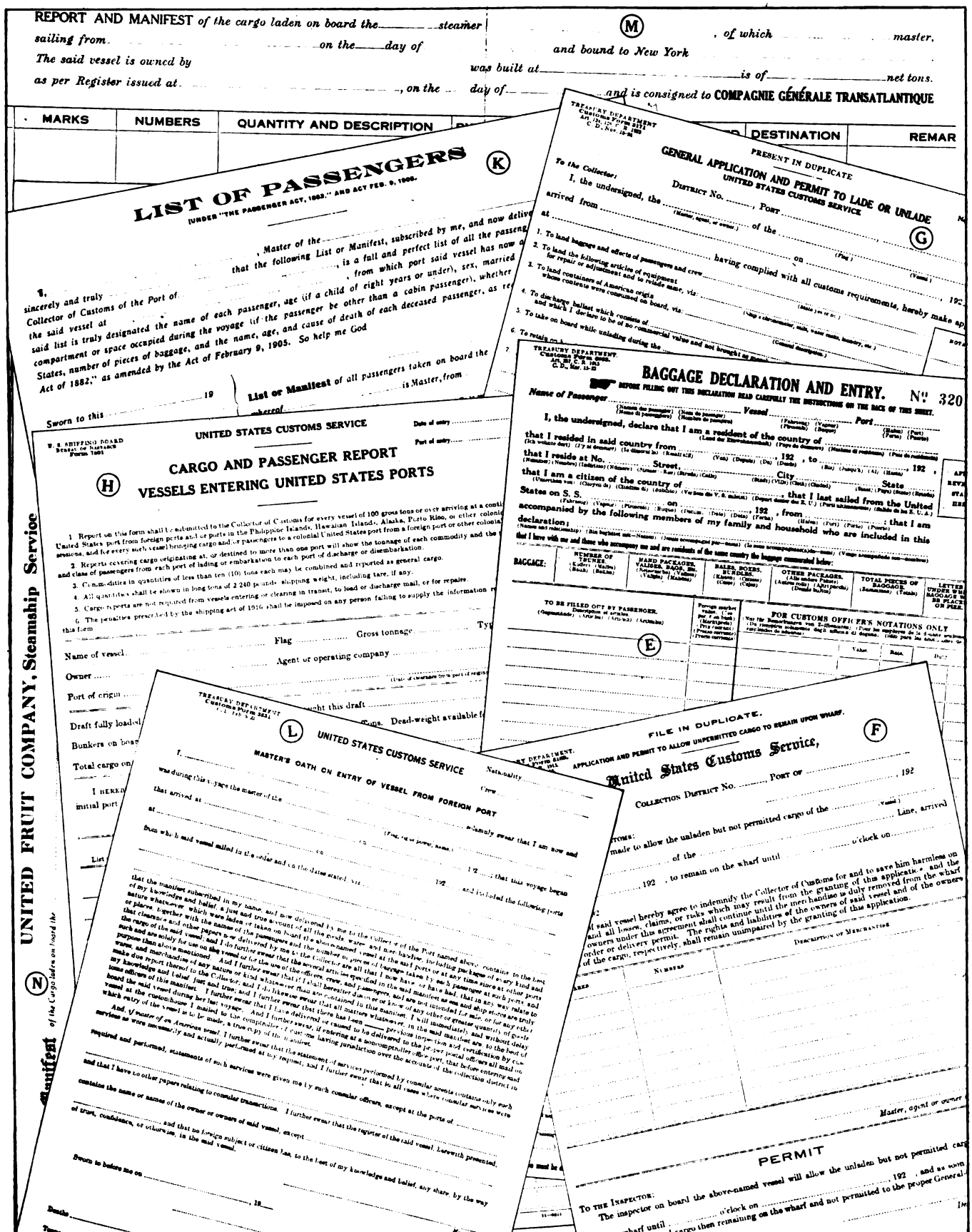
Bureaucrats Lay Burden on Shipping


REPORT AND MANIFEST of the cargo laden on board the steamer
sailing from on the day of
The said vessel is owned by
as per Register issued at
and bound to New York
was built at
and is consigned to COMPAGNIE GÉNÉRALE TRANSATLANTIQUE
MARKS
NUMBERS
QUANTITY AND DESCRIPTION
DESTINATION
REMAR
LIST OF PASSENGERS
UNDER "THE PASSENGER ACT, 1882," AND ACT FEB. 9, 1905.
GENERAL APPLICATION AND PERMIT TO LADE OR UNLADE
UNITED STATES CUSTOMS SERVICE
BAGGAGE DECLARATION AND ENTRY.
CARGO AND PASSENGER REPORT
VESSELS ENTERING UNITED STATES PORTS
UNITED STATES CUSTOMS SERVICE
MASTER'S OATH ON ENTRY OF VESSEL FROM FOREIGN PORT
FILE IN DUPLICATE.
United States Customs Service,
PERMIT
UNITED FRUIT COMPANY, Steamship Service
Manifest of the Cargo laden on board the

THE AMOUNT OF PAPER WORK AND GOVERNMENTAL RED TAPE IMPOSED UPON VESSELS ENTERING AND DEPARTING FROM AMERICAN PORTS MAY BE FAINTLY APPRECIATED BY AN INSPECTION OF THE FORMS REPRODUCED ABOVE AND MARKED E, F, G, H, K, L, M AND N RESPECTIVELY WHILE THOSE ON PAGE 17 ARE LETTERED A, B, C. D—TO FULLY IDENTIFY THESE FORMS REFER TO THE INSET ON PAGE 18

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Can Lake Levels Be Restored?

A Canadian Point of View—Build Regulating Works at Foot of Lake Ontario and in Detroit River

BY C. McKAY

THE time has arrived when a solution of the problem of restoring and maintaining the water levels of the Great Lakes and St. Lawrence waterways must be sought without regard to Chicago's abstraction of water, in the opinion of Col. Robert Starke, president of the Montreal board of trade. A method of restoring both lake and river levels was recently propounded by Dr. Howard Barnes of the department of physics, McGill University, a life-long student of river problems, before a joint meeting of the Montreal board of trade and the shipping federation of Canada. In order to focus interest upon Dr. Barnes' proposals, or any other proposals having the same object, Col. Starke will call a conference of representatives of all Canadian organizations interested in river or lake shipping, and it is probable that the co-operaton of similar American organizations will be invited. The reduction of the water levels of the St. Lawrence below Montreal in the last few years has, it is estimated, obliged ocean ships using Montreal, to reduce their loading draft to an extent entailing an annual loss of $8,000,000. The decrease in the water level of Lake Erie has also seriously affected shipping using the present Welland canal, the water therein being so shallow that a little wind frequently causes boats to sit on the bottom for hours at a time.

Build Regulating Works

"The problem of raising the water levels of the St. Lawrence can best be solved by regulating works at the foot of Lake Ontario, and such regulating works may be filled into a broader scheme to utilize the natural warmth of the waters of Lake Ontario to delay and reduce ice formation in the river and prolong the season of navigation," said Dr. Barnes to the writer. "Similar regulating works should be installed at the foot of Lake Erie to raise the water level of that basin, and possibly on the Detroit river to raise the level of the upper lakes. Such works will be undertaken sooner or later, whether or not Chicago is obliged to decrease its diversion of water from Lake Michigan. Canada must take measures to safeguard the future of its lake and river ports against the possibility that the United States may want to use Great Lakes water to operate canal systems from Chicago to the Mississippi, from Oswego to Albany, or from Cleveland to the Ohio. And in carrying out the works necessary to protect Canadian interests I think we can rely on American co-operation where needed or desirable.

Must Protect Sources

"As a student of the physical laws of rivers, I have come to the conclusion that the key to all river problems must be sought near the source of the river itself. As the source of the St. Lawrence we have Lake Ontario, and beyond, the great basins of the Upper Lakes. Immense as is the volume of water flowing down the St. Lawrence in a day, spread over the great basin of Lake Ontario its effect on the water levels would hardly be noticeable. Several fill-ins blocking the channels between islands in the St. Lawrence between Kingston and Brockville would back up the waters of Lake Ontario, and raise the level by two feet. This would provide a surplus of water, which could be drawn on during the dry spells of summer to maintain the levels of the St. Lawrence at the height required by shipping. These fill-ins between islands would require no great expenditure. In fact, an elaborate system of regulating works at the foot of Lake Ontario could be constructed for much less money than the ocean shipping companies estimate they have lost in the last few years as a result of the reduced river levels below Montreal. As for regulating works to raise the level of Lake Erie, I think they could be carried out cheaply, as compared with what some lake ports have spent to deepen their barbor.

Use Heat of Lake Ontario

"As for prolonging the season of navigation, Lake Ontario is a vast reservoir of natural heat; it never freezes over, though ice forms in shallow bays along the shore. At Kingston at the foot of the lake, ice seldom forms before February, and from there to Montreal there is a definite relation between the times ice forms at different points. When Montreal harbor has been frozen over, I have observed a temperature of 7 or 8 degrees above freezing in open water at St. Lamberts, just across the river from Montreal.

"By utilizing the natural warmth of Lake Ontario, we can delay ice formation on the St. Lawrence for some time, and open the river earlier in the Spring. The problem is to draw water directly from the lake and keep it going via the deep channel on the American channel. This could be done by a few fill-ins which would prevent the water meandering through the Thousand islands district, where the water being shallow cools rapidly. Some regulating works of a similar character below Montreal would probably be necessary; but they would not be expensive."

Water Loss at Chicago

The fact that natural conditions, over which man so far has not attempted to exert any control, are responsible for serious fluctuations in lake vessels, does not in any way excuse or justify Chicago for diverting water from Lake Michigan through the sanitary canal into the Illinois river. In this bitter controversy even the proponents of Chicago's ruthless attitude admit that the levels of the Great Lakes have been lowered by 5½ to 6 inches through such abstraction. This action belongs to the same category as that of the spendthrift who begins to use not only his own capital but also that of his friends because he finds his income inadequate. It is a deliberate destruction by man's own hand of nature's bounty. Chicago is not taking the water that goes over the rim. She has bored her great sanitary tunnel through a natural watershed and every day 864,000,000 cubic feet of water is tapped from Lake Michigan below its normal natural level. How can this be defended?

President Coolidge nominated Jefferson Myers of Portland, Oreg., as a member of the United States shipping board to take the place of Commissioner Haney, resigned. The name has been sent to the senate for confirmation. Mr. Myers is a Democrat, and a successful banker.

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Build Efficient Terminals to Promote River Traffic

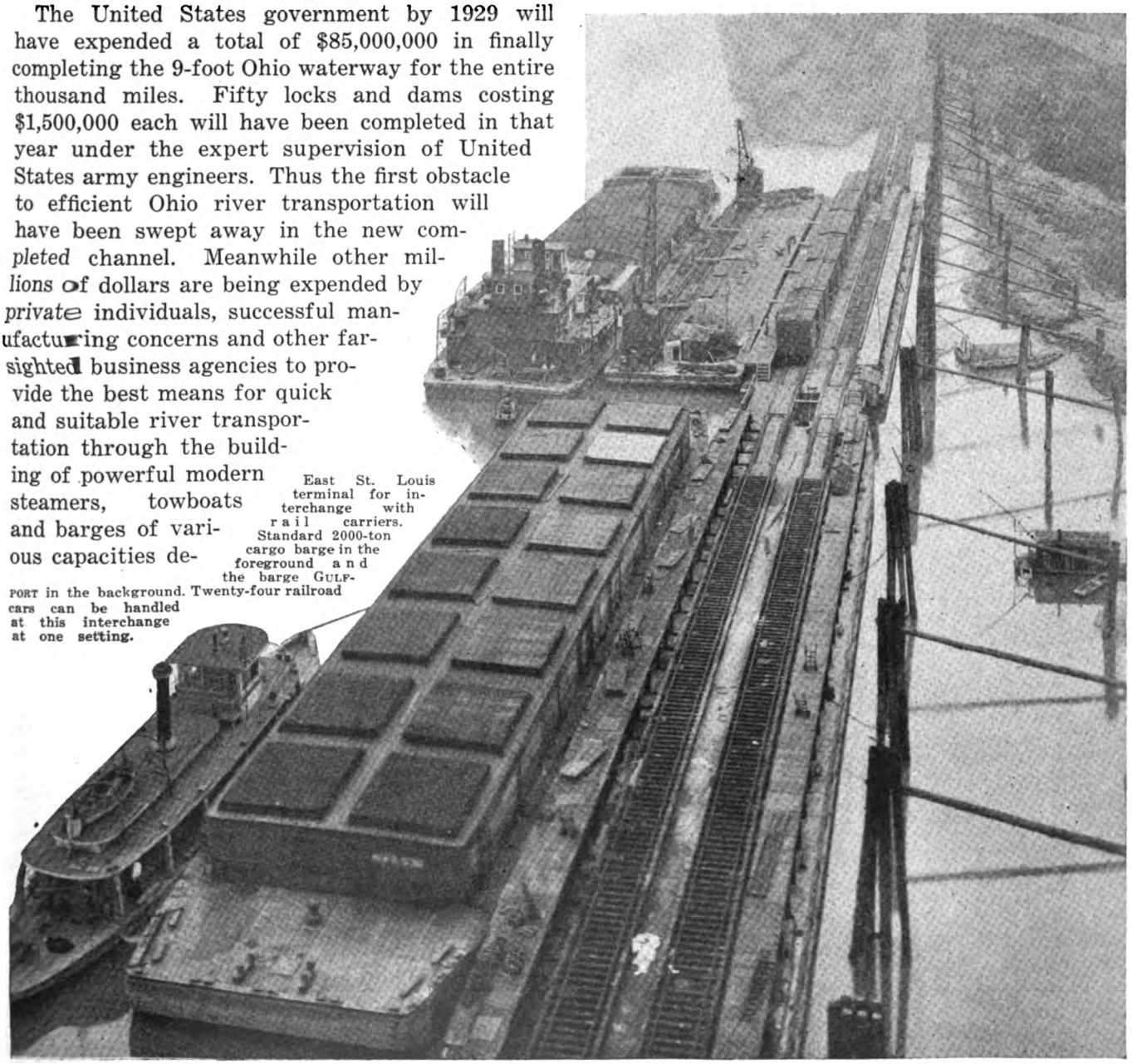
By J. F. Froggett

NEAR APPROACH to completion and formal throwing open to traffic of the 9-foot waterway from Pittsburgh down the Ohio river a distance of 1000 miles to Cairo, Ill., where it meets the Mississippi, and thence onward to the Gulf of Mexico, forces a burning question to the forefront.

How shall cheaply operated but entirely adequate terminals be provided all along this vast waterway that will permit convenient loading and unloading of cargo from steamers and barges at the minimum of cost in time as well as money?

The United States government by 1929 will have expended a total of $85,000,000 in finally completing the 9-foot Ohio waterway for the entire thousand miles. Fifty locks and dams costing $1,500,000 each will have been completed in that year under the expert supervision of United States army engineers. Thus the first obstacle to efficient Ohio river transportation will have been swept away in the new completed channel. Meanwhile other millions of dollars are being expended by private individuals, successful manufacturing concerns and other far-sighted business agencies to provide the best means for quick and suitable river transportation through the building of powerful modern steamers, towboats and barges of various capacities designed especially for moving known freight in small or vast quantities along the new waterway. Thus the second obstacle to successful navigation of the Ohio river is being overcome. The vessels are there and the new channel is being used as far as completed.

The third obstacle is partly physical and partly mental, lying in the minds of the businessmen, manufacturers and taxpayers who are residents of the many important cities that line both banks of the Ohio from Pittsburgh to Cairo. These cities



East St. Louis terminal for interchange with rail carriers. Standard 2000-ton cargo barge in the foreground and the barge GULFPORT in the background. Twenty-four railroad cars can be handled at this interchange at one setting.

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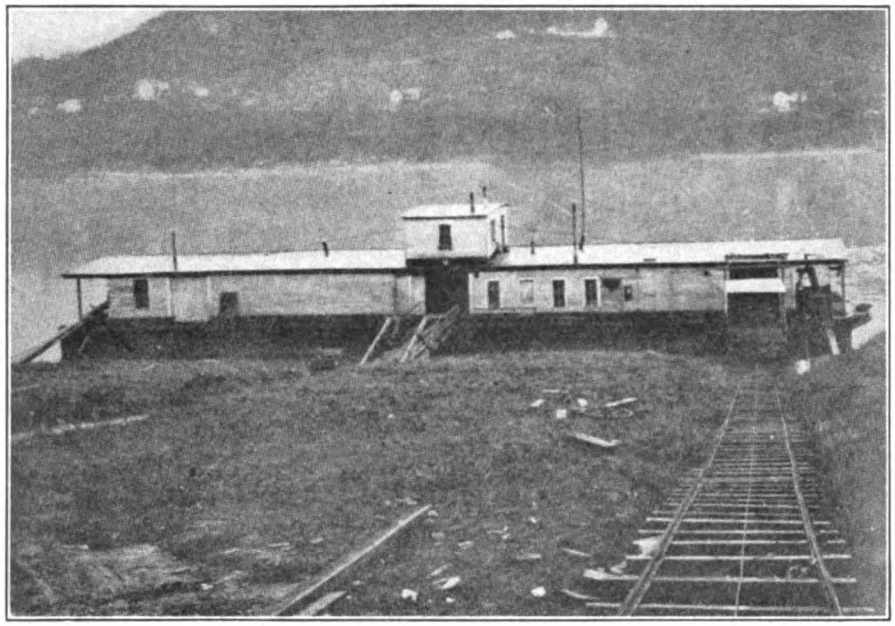

WHARF BOAT AND INCLINED RAILWAY AT HUNTINGTON, W. VA.

must be aroused from their 50-year sleep, fired with the ambition to make their own city an important link in the vast chain of Middle Western navigation, and urged to start immediately on the work of providing suitable river terminals. This takes time, and time cannot be wasted if terminals are to be ready for the opening of the canalized river. The Ohio Valley Improvement association, of which Oscar F. Barrett is president and William C. Culkins of Cincinnati is secretary, is doing yeoman service in endeavoring to arouse the municipalities along the river route to the vital interest they must manifest in providing adequate local terminals for the accommodation of the oncoming rush of the vast new commerce to the West and to the Gulf. The Mississippi Valley association at St. Louis is doing similar work among the cities of the Mississippi valley.

The imperative and pressing need for such terminals thus was set forth convincingly by Capt. F. T. Chambers, of the war department's board of engineers for rivers and harbors, in an address recently delivered before the thirty-first annual convention of the Ohio Valley Improvement association:

Modern Terminals Are Needed

"The valley, after all, does not stop at the river bank. We cannot stop with the completion of the channel and the provision of boats and barges. Successful operation will require that each community have its landing place for the boats and barges, and that this landing place be the most convenient for the particular purpose for which it is used. There must be modern terminals. The process of loading and unloading is expensive. It has increased greatly of late years with the cost of labor. It therefore behooves you to employ an experienced terminal engineer, and to furnish him with the best information available as to the character of cargo, quantities of the various principal kinds, the shapes and sizes of packages, etc. Of course, it is a comparatively easy matter to copy what somebody else has built at another city, but your terminal, under such practice, is likely to be a misfit. River traffic should not be burdened with excessive terminal costs, and must not be if it is to succeed. The situation at each trade center should then be studied with regard to the character and quantity of cargo available. There are, of course, engineers capable of making both the commodity survey and engineering survey and design.

"It does not make a great deal of difference who furnishes the terminal, provided always that it is efficient and that the business of transfer is not loaded down with excess or unnecessary charges; also that adequate facilities are open to all comers on even terms. Experience indicates, however, that in the present condition of inland waterway transportation private companies will only furnish terminals for their own particular purpose. As an instance, the steel companies will provide the terminal at the steelworks, but this would be of small use for general cargo. * * * Both on the seaboard and inland there is a decided tendency toward public ownership of water terminals, and some form of public control is quite general."

Different Commodities Handled

Commodities handled through terminals naturally divide themselves into two general classes: Bulk freight, such as coal, steel, pig iron, sand and gravel; and package freight, such as boxes, barrels and bags. Modern handling of miscellaneous lots of small packages comprises gathering them into large containers which are swung aboard by cranes, or moved bodily

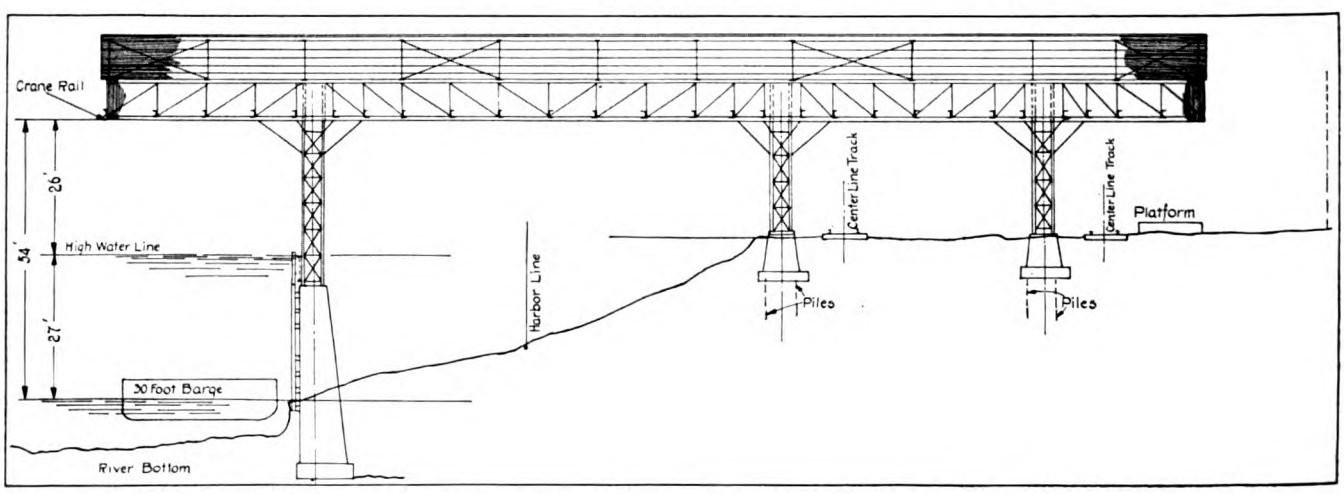

FIG. 1. SIDE VIEW ELEVATION OF THE STANDARDIZED RIVER TERMINAL PROPOSED BY THE W. C. KELLY BARGE LINE, CHARLESTON, WEST VIRGINIA

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away from the terminals in motor trucks or railroad cars.

Terminals for handling bulk commodities usually are constructed especially for the particular industry using them. For instance, along the Great Lakes are built huge ore docks with pockets and chutes at the ore-mine end of the lake route which are constructed particularly for loading 5000 to 12,000 tons of iron ore into a specially constructed vessel in a few hours. At the receiving end of the route, the railroads or the private owners of ore-receiving docks have expended many millions in erecting unloading machinery which in a few hours lifts in bites of 15 tons each the huge cargo from the vessel's hold and deposits it on a dock or puts it aboard railroad trains of special ore cars carrying 50 to 55 tons each. So, too, with the coal carried up the lakes in millions of tons annually. The loaded railroad cars are grabbed up bodily by a great machine, and the contents dumped into the steamer's hold. At upper lake docks this coal is unloaded by huge clamshells. The actual cost of loading ore and coal in this manner is only a few cents a ton, and the unloading charge (for instance for ore it is 12 to 14 cents a ton) is comparatively small. The railroads work very closely with the ore, coal and vessel people in this matter, in some cases expending millions in the building of docks and equipping them with expensive machinery solely to insure getting the business of transporting this ore to inland blast furnaces which consume it.

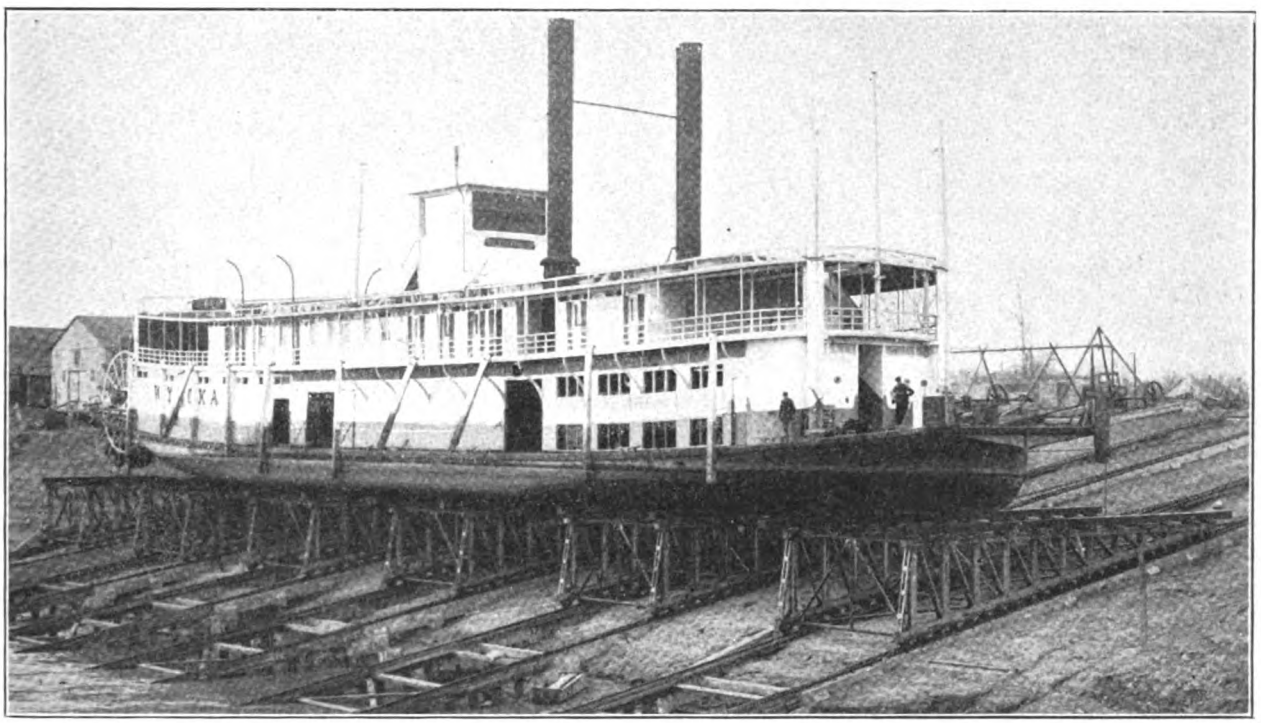
Thus the Northwest gets cheap coal and the steel industry obtains far cheaper raw material such as iron ore even after a vessel haul of 1000 miles from mine to lower lake port. And the railroads get profitable hauls.

Methods Applied for Special Cargoes

Some of this efficiency in handling bulk commodities has been transferred to the Ohio valley by the steel, coal and sand interests. Coal from the mines, for instance, moves in small cars to tipples mounted on the river bank where it is dumped into river barges. When it gets down the river to the coke works of the Carnegie Steel Co. at Clairton, Pa., of the Jones & Laughlin Steel Co. at Aliquippa, Pa., of the Pittsburgh Steel Co. at Monessen or of the Crucible Steel Co. at Midland, Pa., it is unloaded by clamshells or by special bucket unloaders on conveyor belts which carry it to the washers, crushers and finally discharge it into the coke ovens without human touch. Similarly, the sand interests unload the river barges by clamshell into hoppers on the river bank which in turn dump their contents into wagons or trucks driven underneath. But all various interests build solely for their own use, and their equipment and docks are of no general use to the public.

Some of these machinery-equipped river terminals of the steel companies,

Use Side-Haul Railway Dry Dock on Rivers



1500-ton side-haul railway drydock—Mississippi river commission, Memphis, Tenn.

THE side-haul railway dry dock is particularly adapted to rivers with a wide range of water level, where a minimum length of track is essential, and to the light-draft, flat-bottomed vessels which prevail in these waters. Such rivers usually have a low water level lasting several months, with short high-water stages. During low water the rivers are shallow, requiring light-draft vessels, and these must be provided with dry docking facilities not only during the low-water period, but during the flood period also, thus requiring a high lift. During the low water period several vessels may be docked, one above the other, on the incline of such a side-haul dock. This is a most satisfactory type of dry dock.

Photograph reproduced and text reprinted through courtesy of The Crandall Engineering Co., Boston, designers of this interesting railway drydock

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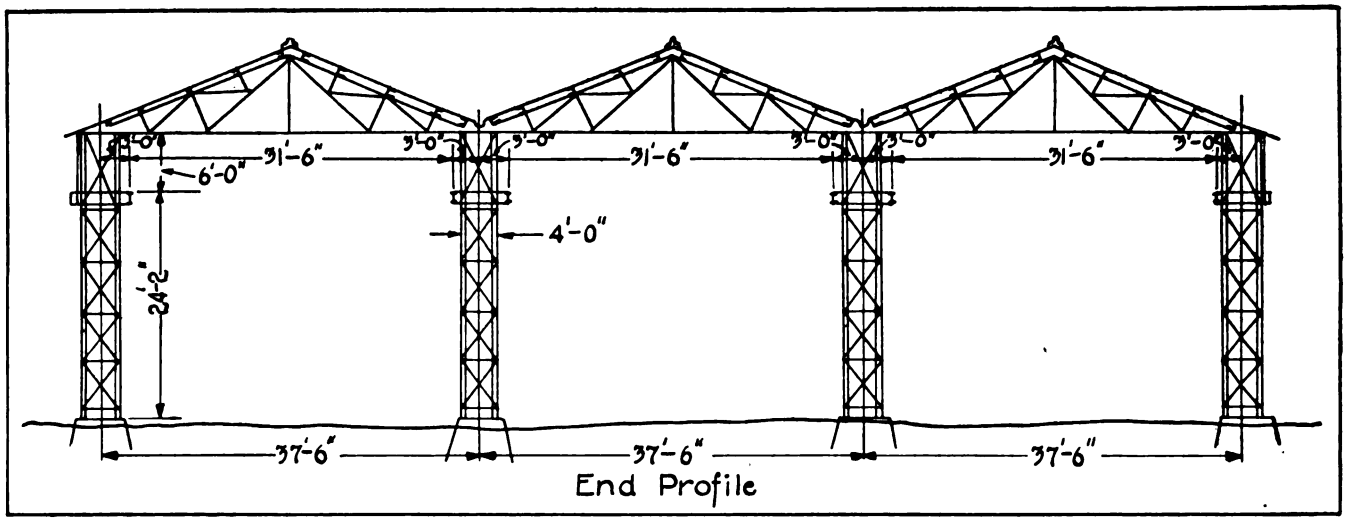

FIG. 2 END PROFILE OF STANDARDIZED TERMINAL SHOWN IN FIG. 1 UNDER CONSTRUCTION AT GLASSPORT, PA., NEAR PITTSBURGH, EVANSVILLE IND., AND ALSO AT MEMPHIS, TENN.

for instance, are of large capacity. The Clairton plant of the Carnegie company has an Ohio river dock frontage of 2200 feet with a concrete river wall 20 feet high, the depth of water alongside being 8 to 10 feet. A fixed reclaiming tower has cranes, overhanging the berth, equipped with two clamshell buckets, which reclaim the coal from the barges and discharge it into hoppers beneath the tower, where, in turn, it is fed to a continuous belt system leading to the coke ovens. Back in the hills along the Monongahela river at the mines, the coal is carried for several miles from the mines on a huge conveyor belt system across the hills and valleys to the tipple on the river bank where it is dumped into waiting river barges. The capacity of this Clairton unloading plant is 10,000 tons per diem. The Jones & Laughlin company at its Pittsburgh works on the Monongahela river has a terminal facility of the same capacity but of a different unloading system. It is a pile dock, faced with heavy planking as protection against ice, is 1200 feet long and is located on 10 to 15 feet of water. The reclaiming equipment consists of the double, belt-bucket, ladder, continuous digger type, depositing in the tower hopper, which in turn feeds the conveyor to the coke systems. Like the Carnegie plant, the Jones & Laughlin plant has no railroad connection and cannot be used by the general public.

Develop General Cargo Terminals

Terminals for general purposes are divided into three classes by undoubted river trade authorities: Direct lift, strongly resembling ocean terminals handling overseas trade; conveyor systems, including belt and slat conveyors and small industrial cars pulled by a continuous hook-and-chain belt between the river level and the land level; and the floating terminal, approached diagonally down the river bank over a standard gage railroad with an adjustable trestle and apron similar to the device used for railroad car ferries both on the Mississippi river and on the Great Lakes.

The direct lift terminal is considered the cheapest, although the machinery equipment as in the cases of the Carnegie Steel and the Jones & Laughlin terminals instanced above, may run into considerable figures. The standardized terminal which is proposed by the W. C. Kelly Barge Line, Charleston, W. Va., and which it is building at Charleston, Glassport, Pa., near Pittsburgh, Evansville, Ind., and also at Memphis, Tenn., is the most graphic illustration of this direct lift system. The company's standardized 500-ton barge is built with three hatches spaced 37 feet 6 inches between centers. The barge moored alongside the synchronized terminal finds each hatch is served by an individual electric hoist, making it possible to unload or load through all three hatches at once, thus cutting down the operating time. This river side of the terminal consists of a massive concrete abutment extending into the river so that 10 to 12 feet of water at low-water mark always is available. The crane runways extend out over the barge and are built back on the bank to a convenient warehouse equipped with railroad tracks for rail interchange.

Since fluctuations in Ohio river levels extend oftentimes 50 feet in height, this furnishes a problem in terminal construction that must be met by skillful engineering. This the Kelly company seems to have met successfully as will be seen by reference to the line drawings of its standardized terminals in Figs. 1 and 2.

The municipal terminal provided by the city of St. Louis at a cost of $1,000,000 shows the general type. It is built parallel with the stream and far enough out to insure 10 feet depth of water at all river stages. The wharf is of concrete construction supported on timber piles cut off at low water. The heads of the piles are protected by riprap. Standard gage and gantry crane rails run on the concrete apron which has at its rear a single story transit shed or warehouse with roof hatches. Standard gage railroad tracks are at the rear of the shed as track sidings. Gantry cranes span the railroad tracks on the apron, the shed hatches and the barge berths in front of the apron. Installed there also is a slat conveyor under the wharf, but since the deck of the wharf is continuous, this conveyor is usable only at low water. Hence it is not often employed, refuge being taken in the direct lift equipment. By this means where small packages are to be handled, these are placed on trucks which themselves are handled through the top hatches of the covered barges. They also can be pushed around on the wharf apron and in and out of the sheds. This wharf has a frontage sufficient to care for four of the standard 2000-ton barges of the Mississippi-Warrior service, now known as the Inland Waterways Corp.

Various Types of Terminal

The second, or conveyor type of terminal is best shown in the unit installed at Memphis where the city has expended $1,500,000 in several different sorts of terminals. At Memphis the river bank is 100 feet above

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Low Lake Levels Reduce Income

Analysis of Increased Capacity by Change in Ship Dimensions to Offset Loss—Proposed Saving in Operating Expense by Simplification

By Herbert C. Sadler, D. Sc.

THE lowering of the levels of the Great Lakes in the past few years has been the subject of great concern to all those interested in the question of lake shipping. In a recent article the MARINE REVIEW pointed out what the decrease in draft available meant in the way of loss to shippers. For the operator and shipbuilder alike, the present state of affairs has introduced the consideration of factors which may have been more or less ignored in times past. Increased cost of fuel, wages, interest, depreciation, higher first cost of vessels, repairs, and laying up charges on the one hand, combined with loss of revenue due to the inability to carry the same amount of cargo for which the ships were designed originally, has tended to bring the receipts and expenditures uncomfortably near together.

Sooner or later, the question of "What can be done to meet the situation?" must be faced. The costs of pig iron, and its constituent, iron ore, wheat and coal are among the principal barometers which influence the trade of the country. In the general economics of the situation, the cost of transportation must eventually affect the price to the consumer, however this may be absorbed in the general cost of production; and freight rates must inevitably increase unless something is done to restore the former lake levels. A survey of the situation as affecting the question of the ships themselves, may therefore be pertinent at this time.

Effect of Altering Dimensions

If it be taken for granted that there has been a loss of 2 feet in available draft, it may be interesting to see how the ships would have to be changed in dimensions so that they could carry the same deadweight on 18 feet instead of 20 feet as in the past. There are three possible changes that can be made: (1) increase the length, (2) increase the breadth, (3) increase both length and breadth. Unfortunately for the ship designer, certain limitations are imposed which do not allow him absolute freedom, but if all restrictions were removed the following Table I shows what the dimensions would have to be to fulfill the conditions of constant deadweight. Three general types have been chosen as illustrations.

The author is head of the department and professor of naval architecture and marine engineering at the University of Michigan.

Progress or Reaction in Ship Design

This article represents the views of the author and is most interesting, particularly so from the rather arresting conclusions arrived at in regard to the adoption of modern features of marine engineering. Professor Sadler's connection with the design of lake vessels and his position as professor of naval architecture and marine engineering at one of the leading universities of the country lends particular force to the statements made.

Though we cannot agree with him in his idea of what constitutes simplification we do feel that lake freighter design has been allowed to grow much like "Topsy" without sufficient or proper direction from qualified sources. If fundamentally engineering means anything it means careful planning, study and development to perfect the instrument best suited in an all around economic sense for the service intended. Why not subject the present day lake freighter and all its equipment to a critical searching analysis in the light of modern engineering knowledge to determine if after all a change in design and a perfection of detail might not bring out a type which would be more economical? Local conditions would of course be given full weight in any real engineering analysis.

True economy in operation will never be realized by a reactionary engineering attitude, and that applies to building ships on the Great Lakes quite as much as it does to building motor cars or central stations. Marine Review is deeply interested in the reduction of operating cost of American vessels so that service at reasonable rates may be maintained while at the same time giving the operator and the man on board adequate returns on their capital and labor. It is therefore to be hoped that the discussion started by Professor Sadler will bring out the views of others who have given this matter their attention.

As any dimension is increased, there is a corresponding increase in weight of hull, machinery and fuel, and consequently not all the increase in displacement is available for cargo.

An examination of Table I shows that, with the present restrictions as to length and beam, little or nothing can be done with the two larger types. It is extremely doubtful if it is desirable to go much beyond the present length of 590 feet (keel) when practical conditions of operation are taken into account. Even supposing that greater length could be used, much heavier hulls would be required on account of other limitations such as beam and depth, which would reduce the advantage in deadweight gained by extra length. The combination of beam and depth have an important bearing on the loading and unloading facilities. The modern docks and their equipment are of a more expensive and permanent type than formerly, so that it is doubtful if conditions would warrant the scrapping of such structures. Anything much over 62 feet beam leads to difficulties and added expense in loading and unloading, so that nothing particularly is gained for the general cost of transportation.

The table also shows that the present 590-foot ship on 18 feet draft does not carry so much cargo as the 530-foot vessel on her original 20 feet draft.

Larger Dimensions Increase Cost

Even with the above assumptions, that is, supposing the dimensions of the vessel are increased to obtain the same deadweight, there is still a loss as compared with the original ship. As the equivalent ships of the larger type lead to impossible dimensions, the results in cost of operation have been shown for the smaller type only in the following Table II. The general running expenses for crew, management, etc., have been assumed constant, and simply the added cost due to coal and capital charges, etc. estimated. The 68-foot beam ship is practically out of the question, so that it would appear that to carry the same cargo per trip today, even if dimensions were altered to suit, would involve an additional cost of from $15,000 to $20,000 per annum.

As was pointed out above, nothing could be done with the larger types, and they would have to take the loss

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due to the 2 feet less draft or about 2000 tons per trip. This, at a freight rate of 70 cents per ton, means a loss of $1400, or for say 25 trips about $35,000 per annum.

So far as the general design of ships is concerned it would therefore appear as if no particular change in dimensions would meet the situation. The above discussion does however, suggest other interesting possibilities.

TABLE I

Effect of Reduction in Draft on Other Dimension

Original Ships	Equivalent Ships		
Dimensions and Deadweight	Length increased	Breadth increased	L. and B. increased
530x60x20—10750 tons d. w	600x60x18	530x68x18	566x64x18
560x60x20—11500 tons d. w	635x60x18	560x69x18	598x98x18
590x60x20—12200 tons d. w	670x60x18	590x69x18	630x64x18

Note: All dimensions are in feet.

Every so often in human activities it is perhaps the point of wisdom to sit back and try to view the whole situation from a philosophical or, shall I say, cold-blooded standpoint. In the gradual development of any industrial enterprise, new ideas, new methods, and new devices continually creep in, and their adoption at any particular time would seem to be a step in advance—and probably it was, or at any rate seemed worth the trial.

Reduce Cost by Simplification

However, in the course of time things began to accumulate and become more and more complicated. Once a certain thing has become established, it is very hard to change, and if a suggestion be made that possible some simplification is advisable, the answer, offhand, is that it is impossible. I said offhand because it is the natural and human way of reaching a decision nine times out of ten.

The point to which I am approaching is this: Is it possible that our modern vessels, particularly from the machinery standpoint, are the best for the type of service rendered, or, in other words, can certain economies be made which will offset, at any rate to some degree, the handicaps described above? Exactly the same problem is before the tramp or general cargo ship owner today, all over the world. Recent types, of British, Norwegian, and Swedish vessels show that the tendency is toward simplification and the elimination of anything tending to increase the coal consumption. A few general examples may be cited. In the first place, every auxiliary possible, such as the air pump, circulatory pumps, feed and bilge and water service pumps, is driven off the main engine. These same auxiliaries, if independent, would not only add to the first cost, but would consume an enormous amount more in the way of steam. In other words, the much greater steam economy of the main engine, as compared with the small and wasteful type of simple engine, is obtained. It is also the general experience that the upkeep of numerous independent auxiliaries is more costly.

Another feature is that the Scotch boiler has been favored. While this type has the disadvantages of greater weight, as compared with other types, there is no doubt as to its reliability, and with the average type of fireman and kind of coal used, its generally satisfactory performance. High pressures, high superheat and their accompanying possibilities of trouble in practical operation, have been avoided.

Even in the ships themselves, while providing for the proper comfort of the crew, the question of the elimination of all unnecessary elaboration has been carefully studied: and in one case at any rate, a return has been made to the use of oil lamps instead of electric light.

With this picture before them, it might be interesting for our lake shipowners to make a careful and cold-blooded comparison of some of the modern and "up-to-date" (?) types with some of the earlier ones. On the one hand we have watertube boilers, higher pressures, superheaters, surface condensers and their accompanying extra pumps, filters, and numerous other independent auxiliaries; on the other, the Scotch boiler, saturated steam, lower pressures, jet condenser and pumps driven off the main engine. Purifiers for boiler feed water seem to be installed in both types, though it is somewhat difficult to see the necessity for the same with the surface condenser. While the writer has not all the detailed figures available, and probably they would vary with different individual cases, some suggestions as to the basis of comparison may be made.

Probably the coal consumed per season, and the amount of cargo are directly accessible from the books, so that the cost of fuel per ton moved is easily obtainable. It may sound unorthodox, but I believe it will be found that the older and simpler types are more economical, in a number of cases, even to the extent of some $8000 or more per annum.

A comparison of the first cost of machinery equipment at present day prices will also prove illuminating. Here again, without being unduly optimistic, it would be possible to save say, $30,000, which with ordinary charges of, say, 12 per cent would amount to another saving of say $4000 per annum. The "real cost" of upkeep on both boilers and auxiliaries might be a little more difficult to segregate, but there is probably some saving possible in this connection and also in the laying up charges.

TABLE II

Increased Annual Cost for Equal Capacity

Original Ships	Equivalent Ships		
	Length increased	Breadth increased	L. and B. increased
530x60x20—10750 tons d. w	600x60x18	530x68x18	566x64x18
I. H. P. 1900	2200	2150	2100
Cost - $810,000	$926,500	$865,000	$890,000
Increased coal cost per annum	$6000	$5000	$4000
Increased depreciation, insurance, etc., cost per annum	$14,000	$7000	$10,000
Total increased cost per annum	$20,000	$12,000	$14,000

Note: All dimensions are in feet.

Elaboration Increases Cost of Ships

In the ships themselves the tendency of late years has been toward greater elaboration. While we all pride ourselves in this region on the superior accommodation of the lake vessels as compared with similar types on the ocean, it is nevertheless a fact that such things as extra plumbing, for example, do add to the cost; and while individual bathrooms and toilets, for each member of the crew might be very altruistic, still it is somewhat hard to reconcile the idea with the ordinary living conditions ashore.

Then there is also the question of speed. It is an established fact that there is an economical speed for the transport of various commodities and in general it does not pay to attempt to move bulk cargoes at high rates of speed, especially over com-

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Increase Capacity of State Ferries

Greater Automobile Capacity First Obtained by Adding 50 Feet to Length—Later Augmented by Widening Each Boat 16 Feet

BY DWIGHT TRUE

IN 1923, the State of Michigan purchased the ferry boat ARIEL, for service as an automobile ferry between Mackinaw and St. Ignace, as a connecting link in the state's highway system.

The ARIEL very soon proved to be of insufficient capacity for the business, and in the fall of 1923, the state purchased the steamers COLONEL POND and COLONEL CARD, which were built during the war for the use of the army, but were never put in commission.

The ships, when purchased, were 130 feet long overall, 28-foot beam, and with a superstructure running the full length of the ship. The headroom on the main deck was less than 7 feet and the deck space was partially blocked off by a row of stanchions down the center.

In order to make them available for the automobile traffic, the steamers were brought to the Great Lakes Engineering Works at Detroit and during the winter were cut in two and lengthened about 50 feet making them 180 feet in length overall. At the same time the superstructure was cut away just forward of the pilot house, leaving an open deck space for trucks and high cars. Aft of this point, strong beams were fitted under the cabins and all stanchions were removed, together with all other obstructions on the main deck, except the engine and boiler casing. This made the after deck space available for cars which were less than 7 feet high and gave a total capacity of 30 to 35 cars for each vessel.

This served the purpose for two years, but during the season of 1925, there were times when the facilities proved to be inadequate.

At the close of the season, they were brought back to the Great Lakes Engineering Works and widened 8 feet on each side, making the total beam 44 feet. At the same time the cabins were raised 18 inches, which, after allowing for an increase in the depth of the strong beams, gave a

(*Continued on Page* 56)

The author is naval architect of the Great Lakes Engineering Works.

MICHIGAN STATE FERRIES MACKINAW CITY AND SAINTE IGNACE AT THE RIVER ROUGE PLANT OF THE GREAT LAKES ENGINEERING WORKS, MAY, 1926, AFTER EACH VESSEL HAD BEEN WIDENED 16 FEET TO INCREASE THEIR AUTOMOBILE CAPACITY AS FERRIES BETWEEN MACKINAW AND ST. IGNACE

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Free Libraries for Ships Appeal to Men and Owners

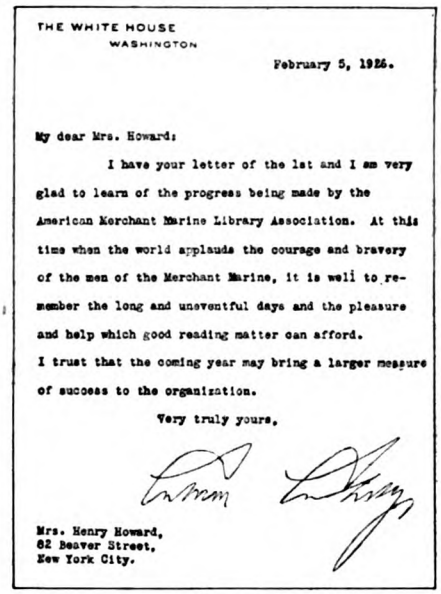
THE average man, let alone the the average sailor, hates to be patronized or uplifted even though the uplift is intended for his own good. Character building must come from within and can best be fostered by environment and example. It is no part of the American Merchant Marine Library association's purpose to patronize, give charity to, or to give that species of unwelcome and uninvited preaching which is always of doubtful value.

It is rather the purpose of this association to provide the vessels of the American merchant marine, in some measure, with the same advantages that are enjoyed by all citizens all over the country in the matter of free libraries. Great libraries are not looked upon in any sense as a charity, but are considered as necessary to our present day American civilization as well paved streets and proper lighting.

Under Able Leadership

We have a feeling that the success of the association in its work is largely due to the fact that its leader has recognized from the start its true purpose and appeal to the men on board ship and to the owners alike. There is no question but that good books will have a strong influence on the moral spiritual and intellectual life, but that is not stressed in loaning libraries to ships.

The American Merchant Marine Library association which maintains a library service for the free use of the crews and officers of the American merchant marine and of the United States coast guard is an outgrowth of the work started and maintained during the war by the American Library association. It was incorporated as a distinct and separate entity in 1921. The president of the association and its energetic moving spirit is Mrs. Henry Howard of Cleveland, who in 1918, as chief of the social service bureau of the shipping board recruiting service, secured the help of the American Library association to supply books to the training ships of the board. The field of this work was later extended to all American merchant ships. This work had been of such great value and was so thoroughly appreciated that when in 1920 it was to be discontinued as a function of the American Library association, the executive board of that organization prevailed upon Mrs. Howard to continue the work with a new and separate association.



THE WHITE HOUSE
WASHINGTON

February 5, 1925.

My dear Mrs. Howard:

I have your letter of the 1st and I am very glad to learn of the progress being made by the American Merchant Marine Library Association. At this time when the world applauds the courage and bravery of the men of the Merchant Marine, it is well to remember the long and uneventful days and the pleasure and help which good reading matter can afford.

I trust that the coming year may bring a larger measure of success to the organization.

Very truly yours,

Mrs. Henry Howard,
62 Beaver Street,
New York City.

No less than 1658 vessels, 400 of which are on the Great Lakes, received free libraries during 1925.

MRS. HENRY HOWARD

Nearly 5000 libraries were lent to ships and stations. In these libraries were nearly one-quarter of a million books. It has been called the public library of the high seas and it is in fact that. The main office and national headquarters of the association is located at 82 Beaver street, New York city, and the director is Carl W. Shattuck. Dispatch offices from which libraries are sent to ships are maintained in most of the leading ports of the country, such as New York, Boston, Baltimore, New Orleans, San Francisco, Philadelphia, Mobile, Galveston, Seattle, Tampa and Sault Ste. Marie on the Great Lakes.

The dispatch agent in charge of each office acts as librarian, visits ships, exchanges libraries and endeavors to learn the needs of the men and to furnish the particular books requested by them. All the books owned by the association are considered as one book stock so that libraries furnished at one port are exchangeable in any other in which there is a dispatch office.

In a recent public drive for books in Cleveland under the personal direction of Mrs. Howard, over a thousand books were brought to the public library in one day and given to the association.

The work of the association should be supported by everyone interested in the welfare of the American merchant marine. The effect of good works is often slow to be felt but it is certain and permanent.

Special Commissioner Lake Diversion

Former secretary of state and associate justice of the United States Supreme Court, Charles Evans Hughes, has been appointed by the Supreme Court as special commissioner to hear the cases arising out of the diversion of water from Lake Michigan through the Chicago drainage canal. Mr. Hughes has indicated that he will accept the appointment and it is expected that hearings will begin in Cleveland early in September.

As a special commissioner, Mr. Hughes will be empowered to take testimony and to compel the attendance of witnesses, acting in fact as a trial court. His findings will be presented to the Supreme Court where oral arguments will be made and final decision reached.

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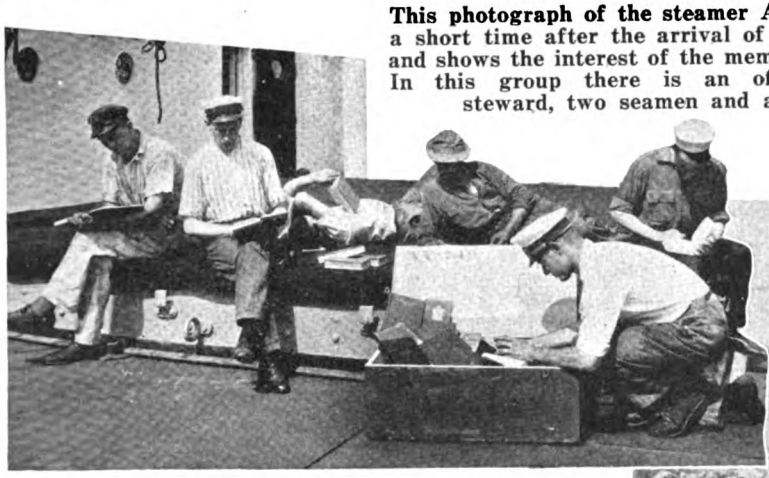
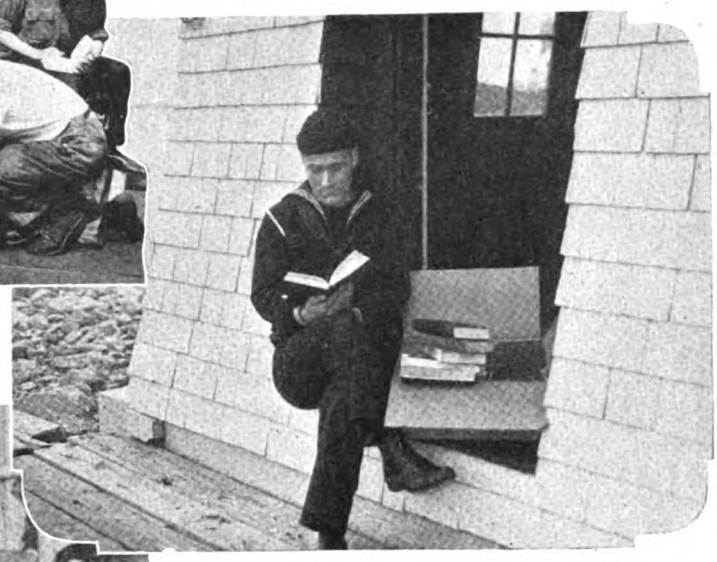


This photograph of the steamer Argosy was taken a short time after the arrival of a chest of books and shows the interest of the members of the crew. In this group there is an officer, boatswain, steward, two seamen and a mess boy



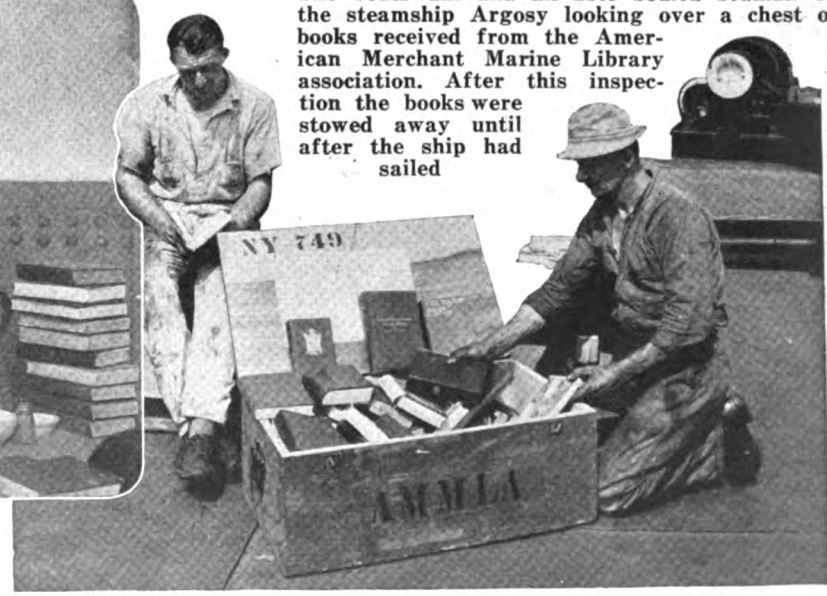
This chief engineer and his assistant find technical books which come in the libraries, of value in carrying on their work. A study of technical features in conjunction with practice is good experience

Henry J. Laundry on duty at No. 5 lookout station, Moon island. He was commended by Washington for his bravery in saving a party of sea scouts who were wrecked from a small boat opposite the station

Steps of the Cleveland public library, May 27, after a drive for books had been under way for four hours. The thousand books shown were contributed by citizens of Cleveland and will help to make up libraries for the men on the ships of the Great Lakes

These able bodied seamen on the freighter American Merchant look as if they might be able to take care of themselves in most any emergency. It is apparent, however, that they like books and cats

The boatswain and an able bodied seaman on the steamship Argosy looking over a chest of books received from the American Merchant Marine Library association. After this inspection the books were stowed away until after the ship had sailed



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From the Old Log Book

Stray Items About the Great Lakes, Atlantic, Pacific and Gulf Coasts and Inland Rivers from MARINE REVIEW Files of 10, 20, 30 and 42 Years Ago

JULY 1884

RECENT flights by airplane and dirigible over the north pole bring to mind some of the harrowing experiences of the early explorers. The *Marine Record* (then the name of the MARINE REVIEW and a weekly) for July 24, 1884 under the simple caption of "Arctic Explorers" carried the report of Commander W. S. Schley of the Greely relief expedition.

* * *

A PORTION of this report, dated St. Johns, N. F., July 17, 1884 *and addressed to Hon. William Chandler, secretary of the navy, reads as follows: "The Thetis, Bear and Lockgarry arrived here today from West Greenland. All well. We separated from the Alert* 150 *miles north, during a gale. At* 9 *p.m., June* 22, *five miles off Cape Sabine in Smith sound, the Thetis and Bear rescued alive Lieut. A. W. Greely, Sergeant Brainard, Sergeant Fredericks, Sergeant Long, Hospital Steward Beiderback, Private Connell, and Sergeant Ellison, the only survivors of the Lady Franklin Bay expedition. Sergeant Ellison had lost both hands by frost-bite, and died July* 6 *at Godhaven, three days after an amputation which had become imperative. Seventeen of the twenty-five persons composing the expedition perished of starvation at the point where found. . . ."*

* * *

IN A later part of the report, Commander Schley stated that the members of the Greely party were much improved since the rescue but that their condition was critical in the extreme when found and for several days after. Forty-eight hours delayed in reaching them, the commander said, would have been fatal to all then living. This simple report is a true epic of American history.

JULY 1896

THIRTY years ago in the July 9 number of MARINE REVIEW an illustrated account was given of an ice crusher built by Sir William Armstrong & Co. of Newcastle, England for service on the River Volga in Russia. These photographs, the account said, were obtained through the courtesy of Frank E. Kirby, naval architect of the Detroit Dry Dock Co. who had designed the big ice crushing carferries then in service at the Straits of Mackinac.

* * *

THIS Russian ice breaker was too long and too deep to pass from the River Neva to the Volga. To make this passage the vessel was built in two sections, each half being a complete unit in itself, with one side flat or straight, which when the units were joined in the complete vessel formed a center line bulkhead. It is most interesting to note that each fore and aft part had its own boiler, engine and propeller, but the rudder was connected to one half only and there was but one pilot house. The vessel steamed from Newcastle to St. Petersburg where without drydocking the two sections were separated by removing the athwartship bolts and plugging the holes. Each half was then floated into a canal boat, which had been partly sunk for the purpose, then shored and water pumped out and in that shape passed through the canal. When sufficient room and water was reached, the two sections were floated out and joined together again without drydocking.

JULY 1906

IN THE MARINE REVIEW for July 5, 1906 there appeared an interesting illustrated article of the new turbine Cunarders. The account stated that as previously announced, the LUSITANIA, the largest ship in the world, had been safely launched on the Clyde on June 7 by Messrs. John Brown & Co.

* * *

TO THIS day the MAURETANIA, *sister ship of the* LUSITANIA *completed about a year after her, is the fastest merchant vessel ever built, though she is not now the largest. The account of* 20 *years ago said in part: "The mere mention of dimensions conveys a vague idea of the size of the* LUSITANIA. *The figures are as follows: Length* 790 *feet; breadth* 88 *feet; depth molded* 60 *feet; gross tonnage* 32,500 *tons, displacement tonnage* 35,000 *tons, load draft* 37 *feet* 6 *inches." It was stated that for two years past the attention of everybody interested in shipping had been focused on the pair of express steamers building for the Cunard line.*

* * *

IT IS most interesting in view of later history to note that the reasons for this interest were stated at the time to be three fold. First, that the vessels will be the largest in the world; second, it is the intention of the owners and the builders that they shall be the fastest in the world; and third, that the turbine system of propulsion will be adopted instead of reciprocating engines.

In a table the coal necessary to steam to New York was given in tons for the Britannia, 1840, 570; the Persia, 1856, 1400 tons, the Galia 1879, 836; the Umbria, 1884, 1900 tons, the Campania, 1893, 2900 tons and the Lusitania, 1906, 5000 tons. The speeds of the Lusitania, Campania and Kaiser Wilhelm II were compared and were given respectively as 25, 22 and 23½ knots.

JULY 1916

THE great war had begun to make itself severely felt in merchant shipping channels ten years ago. An account in MARINE REVIEW of that time stated that approximately 57 merchant vessels of all types with an aggregate gross tonnage of about 116,724 were destroyed during the month of May, 1916, as a result of the operation on the sea of the belligerent nations. This, however, was a great falling off as compared with April when 90 vessels of 214,880 gross tons were destroyed. About 1276 vessels of more than 2,585,362 gross tons had been destroyed from the beginning of the war up to June 1, 1916.

* * *

IT IS hardly any wonder that there was a feeling at the time and for many years afterwards that it would be impossible to catch up by building too many merchant ships. This, however, proved to be a fallacy and as a result we have today many idle ships, particularly those built and owned by the American government.

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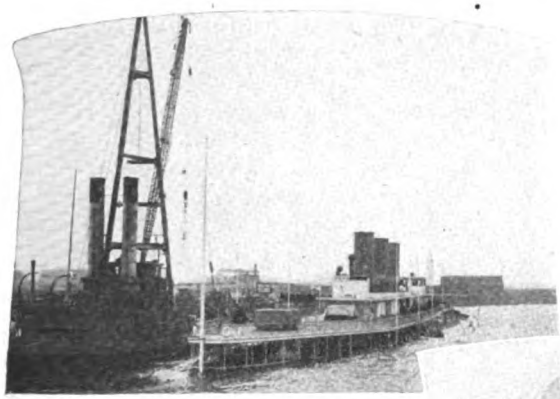
Latest Marine News in Pictures

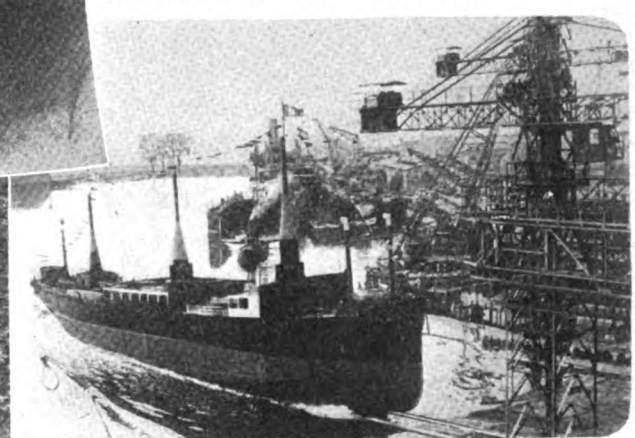


Steamer Washington Irving sunk to the river bottom off Hoboken where she had managed to get after having been rammed by an oil barge on the New York side

Steamers George D. Dixson and Delaware of the Great Lakes Transit Co. icebound in Buffalo

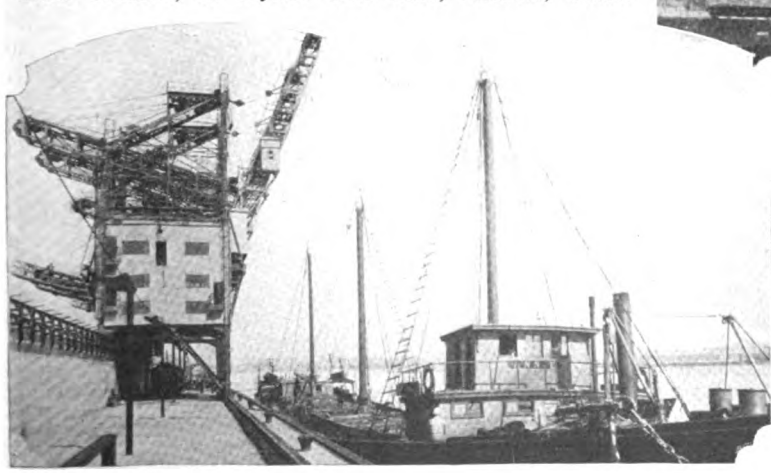
Monument to John Ericsson, inventor of the monitor, unveiled in Washington.

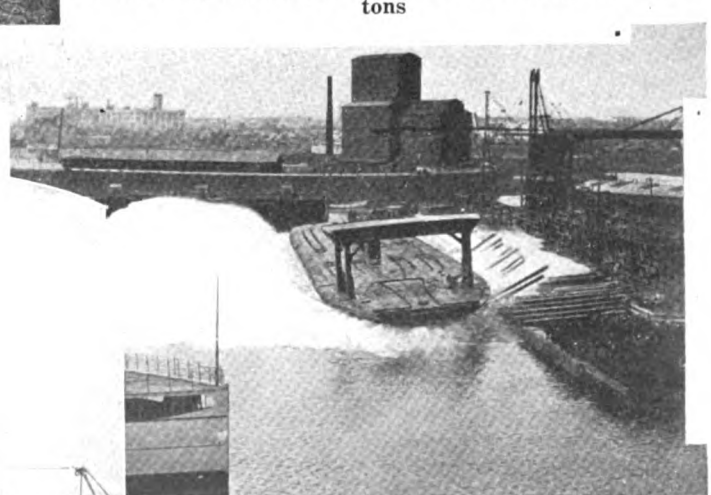
Airplane view taken May 9, 1926 showing lake freighters attempting to get through a solid field of windrowed ice outside of Buffalo on Lake Erie. Forty-two steamers



The Barbara, specially designed as a rotorship to the ideas of Anton Flettner, was launched April 28, 1926 at Bremen, Germany. She is 300 feet long and 3000 tons

On May 13 the barge Annie arrived with the first cargo of ore ever brought in for a New England blast furnace, at Mystic Iron dock, Everett, Mass.





Carferry Manitowoc launched at Manitowoc Shipbuilding Corp. She is 370 feet long, 67 feet wide and 21 feet 6 inches deep and will be the fourth vessel operated by the Wabash railway between Detroit and Windsor

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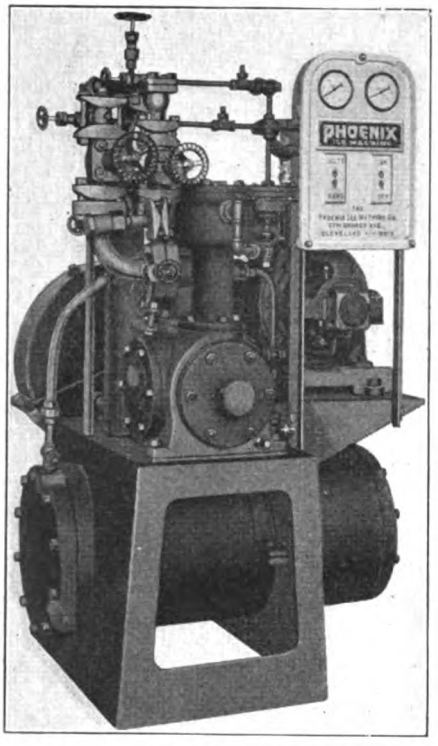
Equipment Used Afloat, Ashore

Unit Type Electric Refrigerator—Electric Galley Equipment, How Heating Element Is Made—Steering Control for Diesel Ships—Cold Cut Saw

MECHANICAL refrigeration has become so generally used ashore within the last year or two that it is no longer looked upon either as a luxury or as uncertain in operation. It has come to be expected that mechanical refrigeration will work day in and day out without breakdown. What has been true of shore practice has been doubly so of marine practice. No vessel today, whether on the Great Lakes, rivers or oceans, of any size, carrying any crew which feeds on board, would be considered properly equipped without an efficient mechanical refrigerator.



UNIT TYPE ELECTRIC DRIVEN ICE MACHINE WITH AUTOMATIC CONTROL—PARTICULARLY SUITABLE FOR SHIPBOARD USE

The Phoenix Ice Machine Co., Cleveland, began building refrigerating machinery 20 years ago. This company has studied particularly the needs and requirements of the marine field. That it has had success in doing so is evident by the fact that this type of ice machine has been installed in many of the newest vessels built on the Great Lakes.

The new model, unit type ice machine electrically driven illustrated and described here represents another forward step. This refrigerating machine unit consists of a two cylinder compressor, driven by a link belt from an electric motor both mounted on a cast iron base. The link belt is enclosed and runs in oil.

In the base of this unit is contained a combination ammonia condenser and receiver. Through this receiver runs a series of pipes conducting a continuous stream of water. This circulated cooling water serves to condense the ammonia gas which is returned from the pipe coils in the cold chamber.

The process of refrigeration may be briefly outlined as follows: The liquid ammonia passes through an automatic expansion valve to the cooling system. At this valve the pressure is reduced below that at which condensation takes place. The boiling point is lowered with this reduction of pressure. As any liquid, including ammonia, will absorb a great deal of heat at this point, refrigeration takes place. Of course the reason why ammonia is used is that it will boil at a temperature very much lower than that of other liquids. At ordinary atmospheric pressure, for instance, the boiling point of ammonia is 28 degrees below zero. Naturally the purpose of the ice machine is to compress the vapor of the gas of the expanded ammonia. In the condenser the heat in the ammonia gas, the temperature of which has been raised by compression, is removed by means of the circulating water.

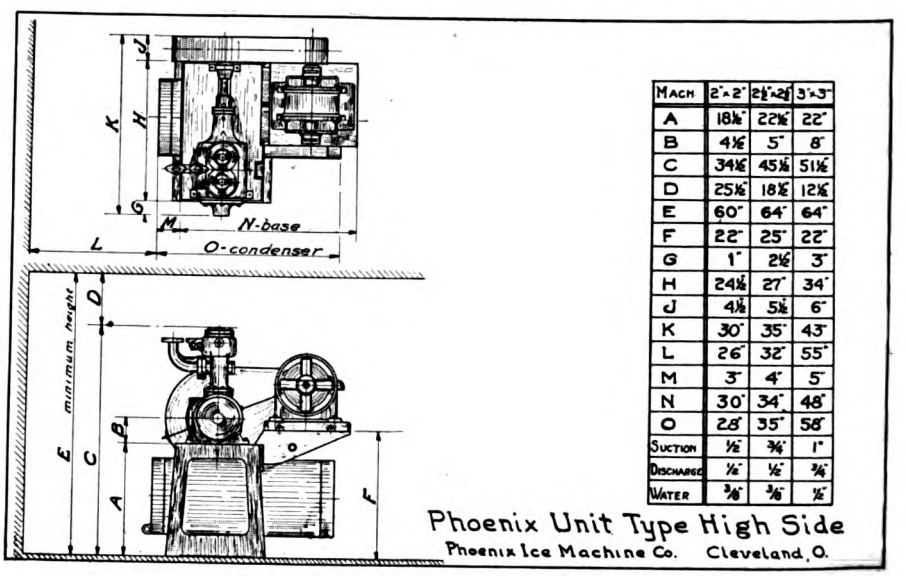
In this machine the cylinders are made separately from the crank case so that should the cylinder or crank case be damaged by accident, repairs or replacements can be quite easily and quickly made. It is also claimed that in this way the internal strain caused by the expansion and contraction of such large pieces of metal is eliminated.

Features of Construction

No other part of an ice machine has given so much trouble as the stuffing box. It has always been a job to keep the stuffing box tight and if an attempt is made to pack it too tightly, increase in friction causes loss in efficiency and it heats up giving constant trouble. In this machine an automatic stuffing box is provided, by means of a coil spring, between the packing rings of the stuffing box. This type of stuffing box is self adjusting, and takes care of the expansion and contraction in starting and stopping. It also gives effective lubrication.

In place of the bulky condensing coils which are ordinarily associated with ice machines on board ship this particular unit is entirely self-contained and has a combination ammonia receiver and condenser in its own

(*Continued on Page* 66)



Mach	2"×2"	2½"×2½"	3"×3"
A	18⅛"	22⅛"	22"
B	4⅛"	5"	8"
C	34⅛"	45⅛"	51⅛"
D	25⅛"	18⅛"	12⅛"
E	60"	64"	64"
F	22"	25"	22"
G	1"	2½"	3"
H	24⅛"	27"	34"
J	4⅛"	5⅛"	6"
K	30"	35"	43"
L	26"	32"	55"
M	3"	4"	5"
N	30"	34"	48"
O	28"	35"	58"
Suction	½"	¾"	1"
Discharge	½"	½"	¾"
Water	⅜"	⅜"	½"

TABLE OF OVERALL DIMENSIONS FOR DIFFERENT SIZES OF THE SELF CONTAINED (AMMONIA CONDENSER AND RECEIVER IN BASE) UNIT TYPE, ELECTRIC DRIVEN PHOENIX ICE MACHINE—AUTOMATIC OR MANUAL CONTROL AS DESIRED

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Dock Management Progress Section

How Successful Dock Operators Have Met Problems of Giving Best Service to Ships

Parr Terminal pier located on the western waterfront of Oakland harbor, Calif.

Terminal at Oakland Attracts Trade

BY W. H. SCHETTER

THE growth of Oakland as a deep water port of call during the past seven years presents a spectacle unequaled in the annals of industrial history. A trifle less than seven years ago that portion of land fronting on the bay and which was known as the western waterfront was a waterfront in name only. What little channel there was available was clogged with mud, only small craft of shallow draft being able to negotiate the passage. This area of land, where now stands the Parr Terminal and the industries occupying the adjacent leasehold, was a dreary, marshy strip of ground, unproductive, and tenanted only by seagulls.

That barren strip of land, which had remained unnoticed and disregarded for so many years, was, in reality, the open sesame to Oriental and European markets. In 1919 Fred D. Parr, head of the Parr Terminal, chose the western waterfront as a terminal site, thereby changing the entire aspect of this section of the city. The breaking of ground for the Parr Terminal unleashed the stored-up powers of the Eastbay and gave it an outlet for its latent energy.

The campaign for the $9,000,000 harbor bonds, which was recently brought to such a successful termination, owed its inception to the fact that Eastbay citizens had been awakened to the potentialities inherent in their far-flung miles of harbor. And the pioneer work of the Parr Terminal, in developing the western waterfront, has been responsible, in a great measure, in bringing home the necessity for further development.

The history of the Parr Terminal, as is usually the case with organization of a pioneer nature, is one replete with losses incurred in the first few years of its existence. The Parr interests erected a commodious terminal, modern in every respect, and planned with attention to every detail entering into the transfer of cargoes from rail to water and from water to rail, which involved an outlay well in excess of $600,000. The terminal completed, numerous transoceanic lines announced their intention of placing Oakland on their port of call list. The ships came, loaded with cargo, but it was soon found that the shallow channel which led to the Parr Terminal was inadequate to accommodate vessels of deep draft. Ship after ship grounded on the mud flats, with the resultant loss in freeing them. Meanwhile, the dredging of the channel, which had been scheduled for completion before the opening of the terminal, dragged on interminably. Complication after complication arose to hinder the dredging operations, which were being undertaken by the civic government and the losses attendant upon grounded vessels kept mounting.

This obstacle has been eliminated, however, for some time past and the Parr Terminal today has at its command a fine deep water approach. Any liner, irrespective of tonnage, is now able to safely negotiate the passage. Coincident with the securing of deep water the Parr interests added materially to their original investment and the terminal is now adequately equipped to handle all types of cargo in any quantity.

These added facilities have enabled the Parr Terminal to secure the largest single order of steel to be placed in the United States during the year 1925. This order, a tremendous total of 78,000 tons of steel in all, is the

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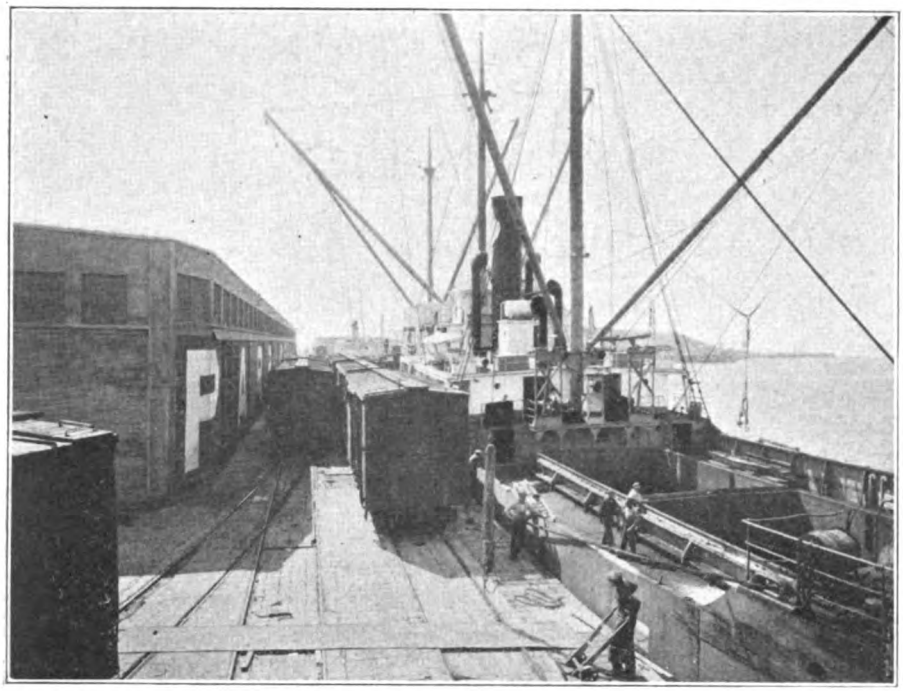

A CLOSE UP VIEW OF THE PARR TERMINAL SHOWING THE DIRECT TRANSFER POSSIBLE FROM SHIP TO CARS OR FROM SHIP OR CARS TO PIER SHED

material for the Mokelumne steel project, a recent bond issue of the city of Oakland. The steel will be rolled in plate form at the Homestead plant of the United States Steel Corp., planed and beveled at the Newport News Drydock and Shipbuilding Co.'s plant, loaded from there upon steamers of the Isthmian Steamship Line, and finally laid down on the docks of the western waterfront.

The handling of this sheet steel by the Parr Terminal will enable the Steel Tank and Pipe Co., an Eastbay concern, to economically manufacture, in its own plant, the segments required for the specified pipe line.

An imposing array of industries are now located on the leasehold of the Parr Terminal, the oil industry predominating. San Francisco bay offers a wide diversity in sites for distributing purposes, but the fact that the western waterfront is more favorably situated for this phase of industry is eloquently attested to by a survey of the different oil concerns now operating on the Parr leasehold.

The Richfield Oil Co. after a comprehensive survey with respect to their particular needs, chose the western waterfront for an operating base. The concern's extensive construction program involved an expenditure of approximately $600,000 and today the organization possesses one of the model distributing plants on the Pacific coast.

The investment of the General Petroleum concern was equally heavy, totaling over $1,000,000. California Petroleum followed with an investment of $350,000. Both these companies were actuated in their choice of location by the same motives that prompted Richfield Oil. The easy manner in which oil and gasoline may be unloaded from tanker or tank car was one of the chief considerations. Tankers loaded with oil may proceed directly to the Parr Terminal, dock and discharge their cargo of oil or gasoline through a pipe line by means of pumps, thus eliminating any unnecessary movement of material. Tank car shipments are handled in a yet easier manner, as the leasehold is adequately equipped with spur track facilities.

Serves Many Industries Well

The latest addition to the leasehold is the Julian Petroleum Corp. The new company contemplates spending approximately $750,000 in providing ample warehousing facilities, steel storage and other equipment necessary for a complete and economical operation of a modern distributing base. Temporary facilities were erected in January and permanent construction commenced immediately thereafter and will continue until fully completed.

Aside from the oil companies, the American Manganese Co., with a total investment of $750,000, has spread the fame of the western waterfront through the medium of its steel products. The company is operating considerable acreage of factory and supplies all parts of the nation and world with its output.

The Stanley-Hiller Co., with an investment of $50,000, is rendering an invaluable service to industry at large by the manufacture of waste conservation machinery. The utilization of waste is being stressed more and more by the country's manufacturers

(*Continued on Page* 66)

ANOTHER VIEW OF THE PARR TERMINAL PIER, OAKLAND, SHOWING LENGTH OF UNCOVERED DOCKING SPACE AND ALSO THE SURROUNDING LAND SUITABLE FOR THE LOCATION OF INDUSTRIES

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AN AIRPLANE view of the Delaware Bridge between Philadelphia and Camden, N. J. A part of Philadelphia's water front showing docking facilities. The modern municipal docks are shown to the left of the bridge. The center span between towers is 1750 feet, 68 feet longer than any other suspension bridge

THE two cables supporting the bridge are 30 inches in diameter each made up of 18,666 separate wires. Each cable weighs 6,750,000 pounds. When entirely completed the bridge will cost approximately $37,000,000. It will be opened July 4, 1926—150 years after the signing of the Declaration of Independence

Delaware Bridge To Open July 4

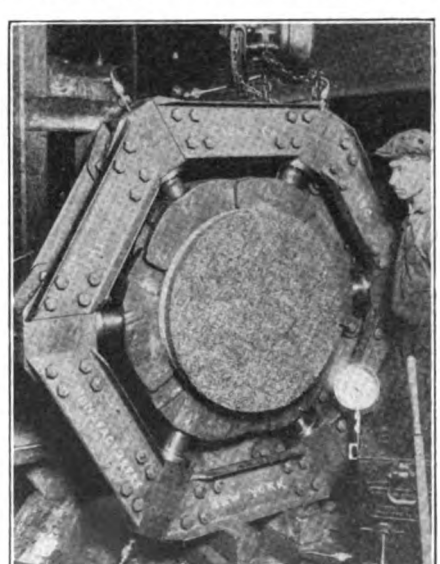
Joins Philadelphia and Camden—Great Engineering Feat Completed—Movement of Shipping Unhindered and Unrestricted

BY RUSSELL BYRON WILLIAMS

BACK in 1816, two engineers by the names of White and Hazzard erected the first wire-cable suspension bridge in the world. The dusty records covering this engineering project say: "This was a foot bridge across the falls of Schuylkill, above Philadelphia, whose cables were of 6 wires, ⅝-inch in diameter, and so a new epoch of development was instituted. The span of the structure was 408 feet; its cost was $125; a toll of one cent was charged for passage, and only eight passengers were allowed upon it at a time." Thus did Philadelphia start something and then finish it, 110 years later, by erecting the world's greatest wire cable suspension bridge which now spans the Delaware river and connects Philadelphia with Camden, Pennsylvania with New Jersey.

This bridge is 9500 feet in length, 135 feet wide, 385 feet high, and with a suspension span of 1750 feet. It is, in itself, an outstanding example of the progress of the American people in 150 years; an example of the vastly differing conditions and circumstances between 1776 and 1926. And on July 4 during the sesquicentennial celebration of the signing of the Declaration of Independence at Philadelphia an electric button will be pressed which will open to vehicular, trolley, rapid transit and pedestrian traffic between the two cities, this largest of all suspension bridges, the mother of which stood across the falls of Schuylkill, 110 years ago.

From an engineering standpoint the new Delaware bridge is a twentieth century marvel. It excels in every way all previous records in bridge building. Heretofore the Brooklyn, Williamsburg and Manhattan bridges held first place in suspension bridge construction. All of these, however, have been eclipsed in almost every dimension by the new Delaware river bridge. Instead of being hung by two cables formed of six strands of ⅝-inch wire the new bridge is suspended by two, finely woven, steel wire cables, 30 inches in diameter (18,666 strands of No. 6 wire each). Rather than being limited to 8 foot passengers at a time the new bridge will accommodate 6000 automobiles an hour, in company with four lines of rail traffic and two 10-foot streams of pedestrians. The live load is calculated at a maximum of 12,000 pounds per lineal foot of bridge, while the structure itself, being more than a mile and a half in length, will add enormously to the weight that must be suspended by the two cables. Indeed, the tensile strength of each cable is 223,000 pounds per square inch, or something over 100,000,000 pounds per cable.



CROSS SECTION OF END OF CABLE AFTER A PRESSURE OF 30 TONS HAS BEEN APPLIED—NOTE ABSENCE OF STRAND INDIVIDUALITY—LENGTH OF CABLE 3550 FEET

All of the wire used in the weaving of these enormous cables, if stretched out in a single piece, would total 25,100 miles, sufficient to encircle the earth at the equator and have enough left over to reach from Pittsburgh to New York. This wire was merely wound into large reels at the factory of the Page Steel & Wire Co., the weaving into cables being done right on the job. When it is remem-

(*Continued on Page* 70)

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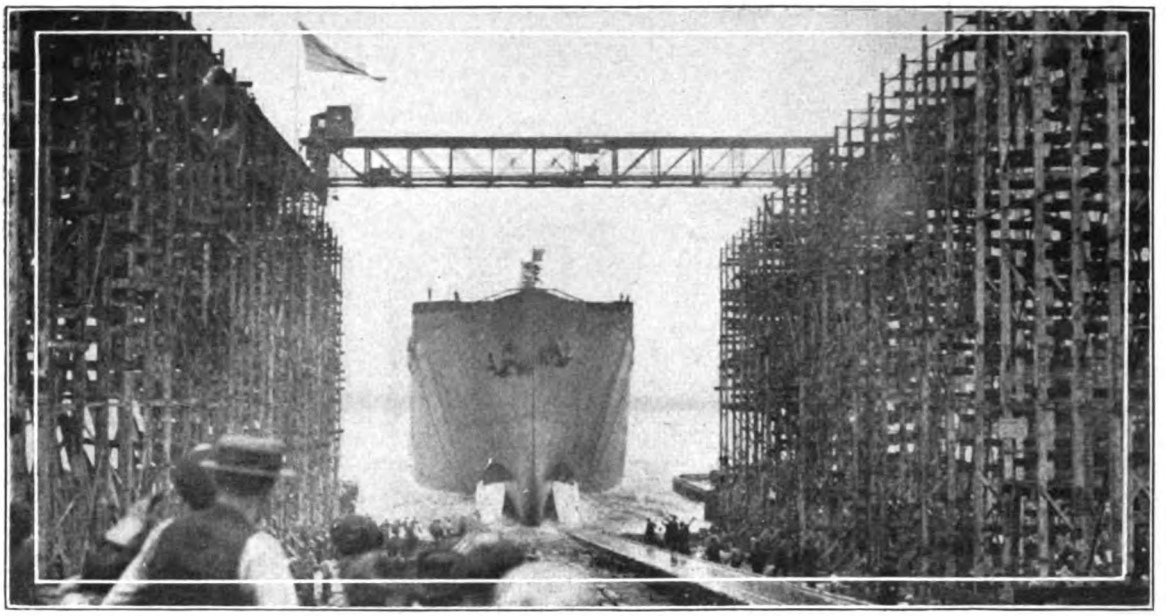
Launching of T.S.S. Malolo Marks Achievement in Shipbuilding



T. S. S. MALOLO launched at Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, June 26, 1926

Largest and Finest American Built Passenger Ship Is Launched —To be Equal to Any Express Passenger Vessel in the World

By E. C. Kreutzberg

THE twin screw express liner MALOLO, a fine new ship which will cut the present steaming time of six to seven days between San Francisco and Honolulu to from four to four and one-half days, was launched June 26 at the yards of William Cramp & Sons Ship & Engine Building Co., Philadelphia. She was christened by little Bernice and Lurline Roth, twin grandchildren of the late Capt. William Matson. Herbert Hoover, secretary of commerce, and P. S. Teller, commissioner of the United States shipping board, represented the government. Particulars of the MALOLO have been widely published and a description will be found on page 40 of the April 1926 number of MARINE REVIEW.

It was a day more typical of April than June. Now and then there would come a little shower.

Officials of the American-Hawaiian Steamship Co., for whom the vessel was officially built and of the Matson Navigation Co., who will take over the vessel on completion and operate it, were on hand in force with their families. E. D. Tenney president of the Matson line was on from Honolulu and presided at a luncheon given at the Penn Athletic club, Philadelphia, prior to the launching.

The personality of the late Captain Matson dominated the atmosphere surrounding the launching. Mr. Tenney told how Captain Matson started in the Hawaiian trade in 1882 with a 200-ton schooner, the EMMA CLAUDINA. The first ship in which the captain had an interest was the brig LURLINE which was built by him. At that time ship ownerships were split up into thirty-seconds, said Mr. Tenney, and he said that Captain Matson, by putting up all the money he had or could borrow, took ownership to eight of these thirty-second interests. After that Captain Matson built steamers. Mr. Tenney illustrated the tendency in the Matson line by telling about the growth in the number of bath-tubs on the Matson ships. The WILHELMINA, built in 1906, had 11 bath-tubs, which was regarded at the time as the height of extravagance. Later Captain Matson built a boat for 252 passengers with 32 baths. The MALOLO, Mr. Tenney pointed out, with accommodations for 693 passengers, has 152 baths.

Great interest was reflected in the address of Herbert Hoover for the reason that it represented the government's voice on this occasion. The outstanding portions of the remarks of the secretary will be found in the inset on page 37. He expressed

Launching Data T. S. S. Malolo

Here are some interesting launching facts on the Malolo. The weight of hull, machinery and dunnage came to 9900 tons, the weight of the cradle to four hundred tons, making a total weight for ship, and all, of 10,300 tons. The ways sloped at the rate of 0.701 inch per foot, the slope of the keel was 0.63 inch per foot. The length of the sliding ways was 462 feet 4 inches, the pressure on the fore poppets at pivoting was 1720 tons and the mean pressure per square foot before launching was 1.86 tons. The draft of water over the end of the ways was 9 feet 6 inches and the maximum way end pressure per square foot was 10.5 tons.

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the opinion that this trade would serve as the basis for ultimately building up a foreign trade under the American flag.

P. S. Teller, commissioner of the United States shipping board, spoke at the luncheon. He said that whereas the big problem had been one of getting rid of ships, the present problem is one of upbuilding the merchant marine. "Nobody had a vision of the future until the MALOLO came along," said Mr. Tenney. "She points the way which must be followed by others on both the Atlantic and the Pacific."

William Francis Gibbs, president of Gibbs Brothers, Inc., New York, who designed the MALOLO, told about the unusual instructions that were issued when the Matson interests undertook the creation of this vessel. "I was told," said Mr. Gibbs, "that the MALOLO was to be the equal of any express passenger vessel in the world. This was a most unusual thing. Similar instruction had not been given in connection with the construction of a vessel in 20 years." Mr. Gibbs, in alluding to his work as naval architect, styled himself as the "goat." Although realizing that the greater portion of the opportunity for making a success of the MALOLO devolves upon the operating company, he said, he is entirely willing to take the blame or credit that will arise out of the ship's performance.

Others at the speakers' table included William P. Roth, vice president of the Matson Navigation Co., W. H. Sellander, passenger traffic manager of the Matson Navigation Co., J. D. Tomlinson, vice president of the American-Hawaiian Steamship Co., W. Freeland Kendrick, mayor of Philadelphia, Commissioner Walsh and John E. Bailey of the United States shipping board.

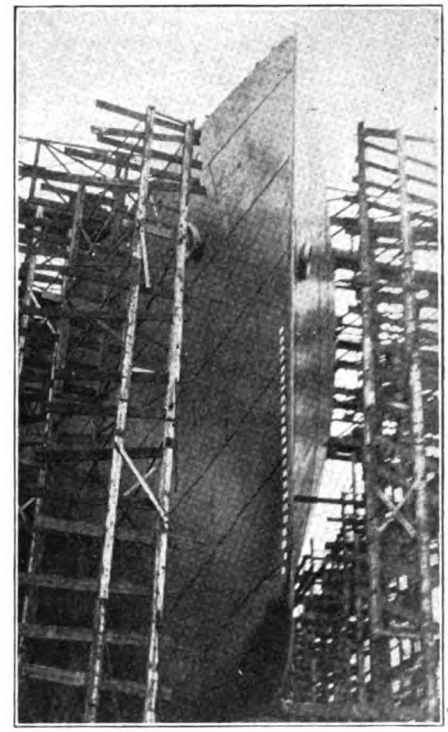
An Essential Policy from Hoover's Speech

*** * * The launching of a great ship stirs deeply our imagination and our racial instincts. * * * We came by the sea to this land, and pride and romance of the sea runs strong in our blood.**

And we are a sea-faring people. In our coastwise trade and its extension to Porto Rico and Hawaii and other outlying possessions, and in the service of the Great Lakes we have over 7000 vessels under the American flag, totaling over 8,900,000 tons and employing over 100,000 seamen. These services alone comprise nearly 14 per cent of the world's tonnage. * * *

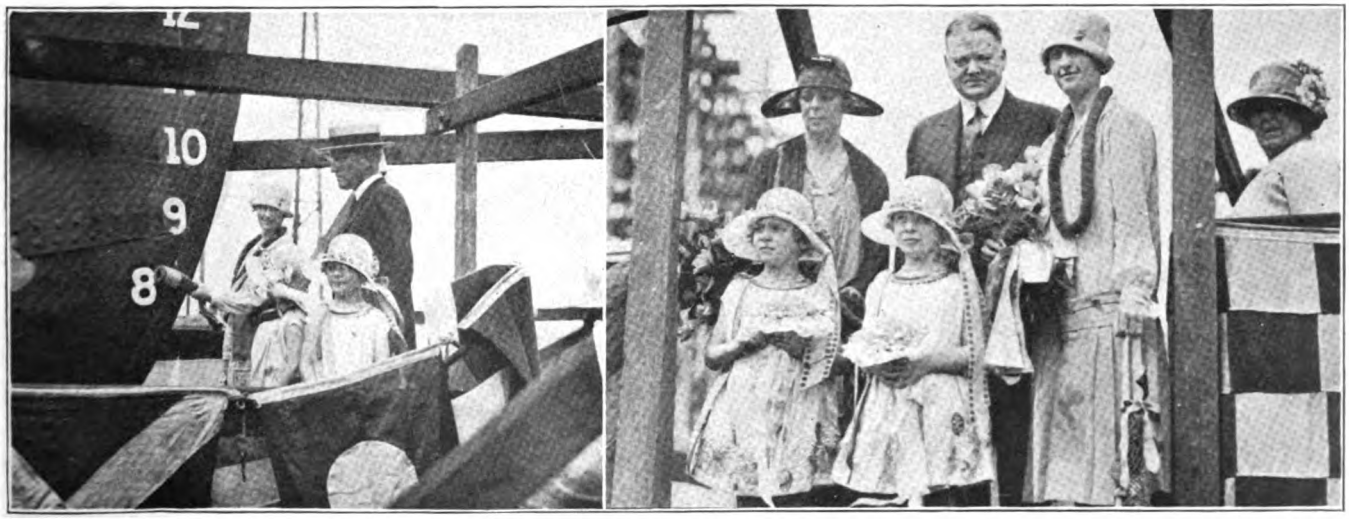
We have engaged in interminable discussion and effort during these last 15 years to expand our merchant marine across the seas. We have today some 3,600,000 tons actively engaged in international trade of which 1,720,000 tons are privately owned. At least we are learning that governments cannot conduct competitive business. * * *

This great transportation system asks no governmental aid and no public subsidy. It has been built up and is sustained by the impelling force of American individualism. We have a sea-coast longer than that of any maritime nation, teeming with productive communities and demanding the facilities of commercial intercourse. There is no richer source for the transportation of passengers and property. * * * The only contribution of government has been in the preservation of this American trade in American ships. That government policy has been adhered to through all our national life against every effort to break it down. It is an essential national policy. * * *



A BOW VIEW OF THE MALOLO SHORTLY BEFORE LAUNCHING. THERE IS AN INDICATION OF SPEED

At the same time a luncheon at the Ritz Carlton was tendered to the ladies of the launching party by Frederic H. Gibbs, vice president of Gibbs Brothers Inc. The trip to the shipyard was made in limousines provided for the occasion. Secretary Hoover's car was in the lead and the procession, attended by a squad of motorcycle police, moved out to the yard without any delay. At the yard everything was in readiness. All but 28 of the 110 keel blocks had been



AT LEFT—MISS WILHELMINA TENNEY, DAUGHTER OF THE PRESIDENT OF THE MATSON NAVIGATION CO., F. L. CRAMP AND THE SPONSORS BERNICE AND LURLINE ROTH (TWINS)—GRAND CHILDREN OF THE LATE CAPT. WILLIAM MATSON FOUNDER OF THE LINE—AT RIGHT—IN ADDITION TO THOSE ALREADY MENTIONED—MRS. W. P. ROTH, WIFE OF THE VICE PRESIDENT OF THE LINE AND MOTHER OF THE TWINS, SECRETARY OF COMMERCE H. D. HOOVER AND MRS. WILLIAM MATSON—JUST BEFORE THE LAUNCHING OF THE T. S. S. MALOLO AT WM. CRAMP & SONS S. & E. B. CO., PHILADELPHIA, 3:30 P. M. JUNE 26

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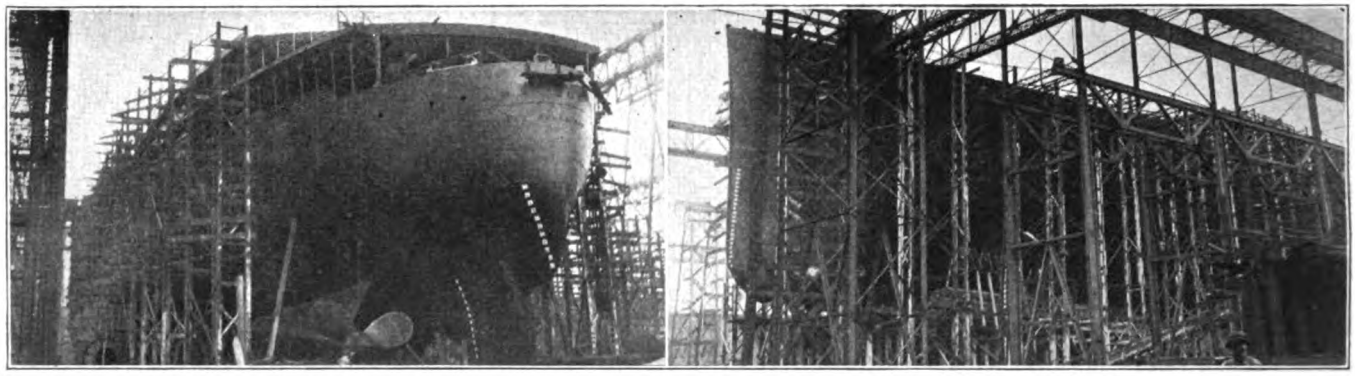

View of the MALOLO showing cruiser type of stern, balanced rudder and one of her twin propellers with completely plated over shaft struts—Side view of forward end giving but a suggestion of the beauty of her lines

knocked out. Promptly at 3:30 o'clock, when the tide was right, the crews sawed through the planks holding the sliding ways and the ship without mishap of any kind ploughed her way into the Delaware river. It was a perfect launching.

Arrangements for handling the visitors to the launching, were of an elaborate character. A special car was provided for the occasion to take visitors from New York, and back. Following the launching a buffet luncheon was served at the shipyard. It was estimated 5000 attended.

Analysis of Bids-S. S. Mount Vernon

Opened June 8, at 45 Broadway, New York City

Contract	Todd Shipyards Corp. Tietjen & Lang Drydock Co., Hoboken, N. J.	Newport News Shipbuilding & Dry Dock Co., Newport News	U. S. Navy Yard New York	J. C. Knipp & Sons (Separate Contractor), Baltimore	Wm. Baumgarten & Co. Inc. (Separate Contractor) New York City	Rex Cabinet and Linoleum Co. (Separate Contractor) Union City, N. J.
M.V.C.-1 "General contract." Pages 1-344 Time	$2,790,170 295 days	$3,100,000 310 days	$4,109,338 Feb. 28, 1927			
M.V.C.-2. Drydocking and underwater work. Pages 1-8 Time		$105,000 30 days	$15,983			
M.V.C.-3. Outfitting cabin public rooms and original suites. Pages 1-51 Time	$146,600 As for contract No. 1			$143,081	$146,000 $138,000*	
M.V.C.-4. Wooden bedsteads, Pullman and combination sofa berths. Pages 1-13. Time	$54,980 As for contract No. 1			$53,375		$49,876
Certified checks accompanying tenders	$31,000	None	None	$1430.81 $533.75	$1,460	$498

*In New York or Boston.

NOTE: The Sun Shipbuilding & Drydock Co., Federal Shipbuilding Co., William Cramp & Sons Ship & Engine Co., W. A. Fletcher Co., American Brown Boveri Electric Corp., United States navy yard, Boston and United States navy yard, Norfolk sent word that they were unable to bid. The navy yard in Boston offered two bids for dry docking and under water work $26,800 for dock No. 2 and $31,200 for dock No. 3 while the Norfolk navy yard bid $7525 and 10 days for this part of the work.

Specifications have also been issued for the reconditioning and restoration of the S. S. AMERICA which burned at her pier at Newport News just after having been reconditioned. Tenders for this work were to be received at 45 Broadway, New York City on June 21. It is known that Newport News Shipbuilding & Dry Dock Co. was the low bidder with $1,770,000, but no details as to the result of the opening of bids were available before going to press.

Diesel Conversion Program

A Summary of Installation Contracts Made by the Shipping Board to June 22, 1926

Vessel	Engine	Contractor	Price	Status
WEST HONAKER	McIntosh & Seymour	Bethlehem Shipbuilding Corp. Fore River Plant	$410,120	Vessel now at ship yard.
WEST CUSSETA	McIntosh & Seymour	Same	410,120	Same
CROWN CITY	Same	Same	411,620	Contract not yet executed.
UNICOI	Worthington Pump & Machinery Corp.	Newport News Shipbuilding & Dry Dock Co.	353,500	Vessel now at ship yard.
TAMPA	Same	Same	353,500	Same
SAWOKLA	Busch-Sulzer Diesel Engine Co.	Same	389,750	Contract not yet signed.
CITY OF RAYVILLE	Same	Same	389,750	Same

Reappoints T.V. O'Connor

T. V. O'Connor, first appointed to the United States shipping board by President Harding, was given a reappointment as chairman of the board by President Coolidge. The term is for six years. For the last two years Mr. O'Connor has been chairman. He represents the region of the Great Lakes on the shipping board and his home is in Buffalo.

Chairman O'Connor has conducted his office with energy and good sense and there can be no question that he is an ardent supporter of an American merchant marine. His policies for selling and scrapping the ships of the board are sound.

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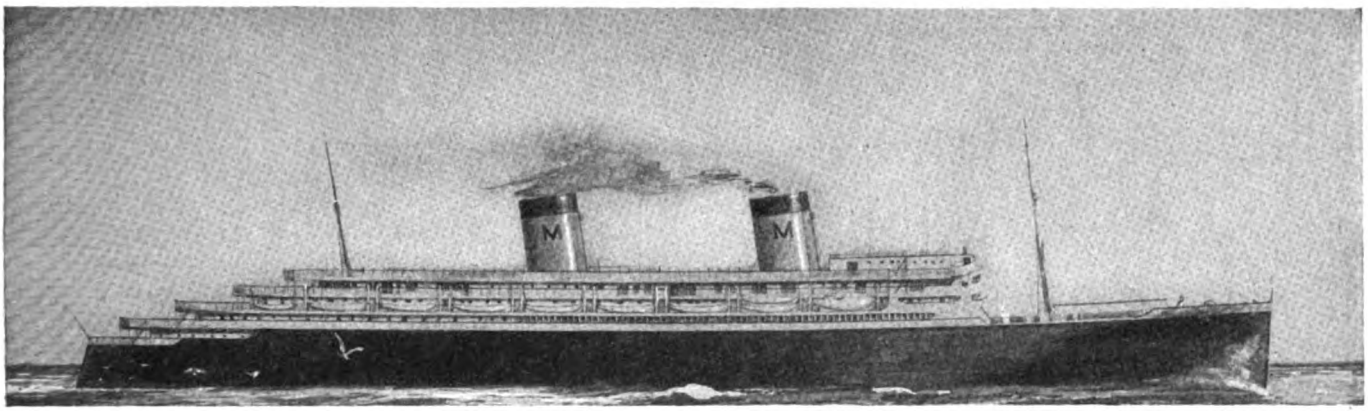
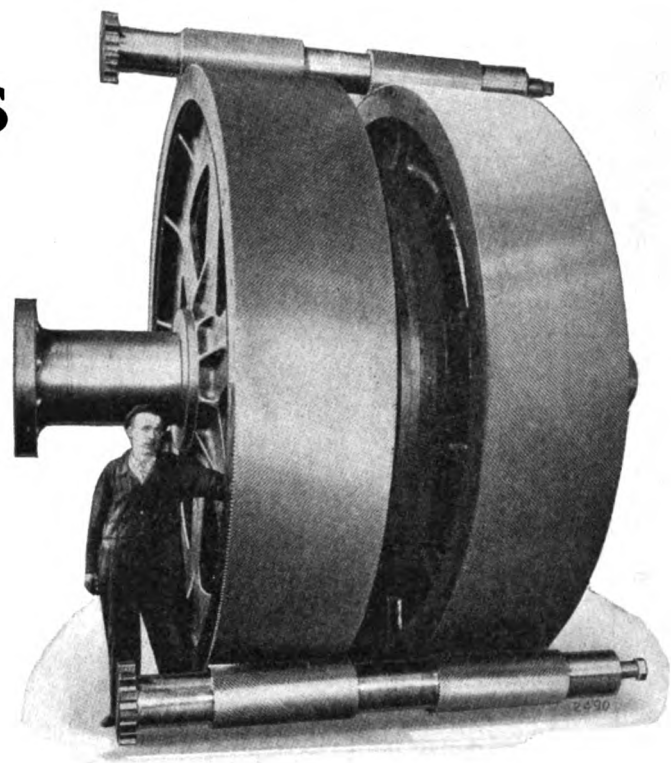


De Laval Gears

for the

Malolo

THE twin screws of the new 22,000 ton MALOLO of the American-Hawaiian Steamship Company will be driven through two De Laval double helical speed reducing gears, one of which is shown herewith. These are the largest marine gears ever built in America, having a pitch diameter of 141 inches and 57 inches working face. The reduction ratio of the gear is 12 to 1, giving a propeller speed of 125 r.p.m., which is required to drive the ship at 21½ knots.



One of two De Laval two pinion gears for the Malolo.

The unequalled record of De Laval gears in marine service has led to their use in the leading vessels built in recent years, as the MALOLO, EL OCEANO, EL COSTON (EX-BIENVILLE), MUNARGO, CARIBOBO, BOSTON, NEW YORK, etc., as also in the high speed scout cruisers TRENTON, RICHMOND, MEMPHIS, MARBLEHEAD and CONCORD. De Laval geared marine turbines realize the highest efficiencies and lowest operating costs possible with modern steam conditions and are unsurpassed for reliability in operation.

De Laval Steam Turbine Co.

Trenton, New Jersey

LOCAL OFFICES

Atlanta, Boston, Charlotte, Chicago, Cleveland, Denver, Duluth, Havana, Helena-Houston, Honolulu, Indianapolis, Kansas City, Los Angeles, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Portland, Ore., St. Paul, Salt Lake City, San Francisco, Seattle, Spokane, Toronto, Vancouver

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Manufacturers of Steam Turbines, Centrifugal Pumps, Centrifugal Blowers and Compressors, Double Helical Speed Reducing Gears, Worm Gears, Hydraulic Turbines, Flexible Couplings and Special Centrifugal Machinery

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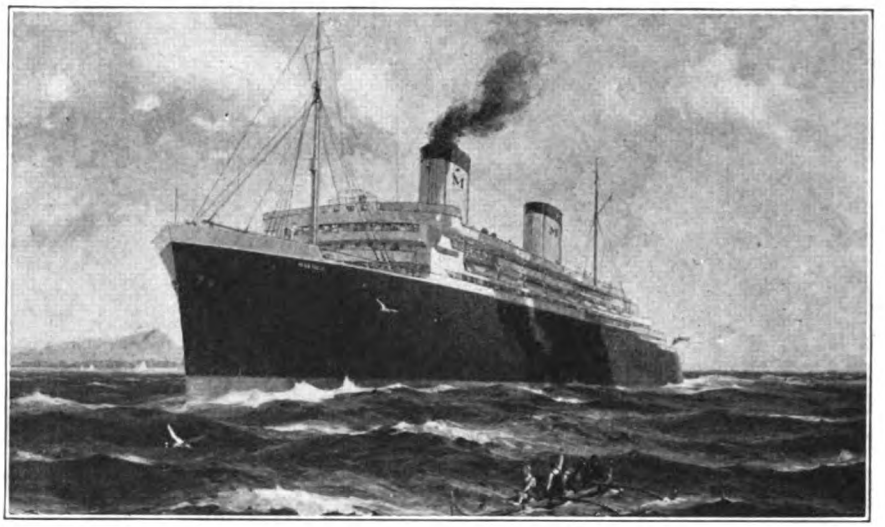
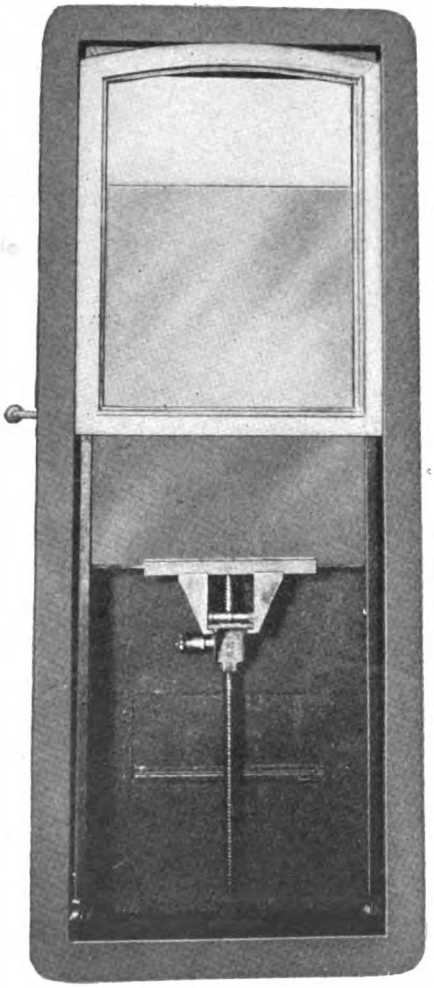


BECLAWAT

(BECKETT, LAYCOCK & WATKINSON)

UNITYPE DECK HOUSE WINDOWS ON THE MALOLO



An improved deckhouse window has been developed by our designers, which meets the architect's specifications of weather tightness, the builder's desire for compactness and the owner's need for satisfactory service.

This latest product of the Beclawat factory is known as the "Unitype" window, as it contains all the necessary features of a window in one combined unit.

The brass weathering frame and steel supporting frame are fixed to the steel plate of the deckhouse.

The weathering of the window by means of an easy throw control handle provides against leakage under all conditions.

The glass is raised and lowered by a crank which interlocks with the weathering lever.

Windows for enclosing the promenade deck of this great vessel were supplied by us.

KEARFOTT ENGINEERING COMPANY, Inc.

95 LIBERTY STREET NEW YORK

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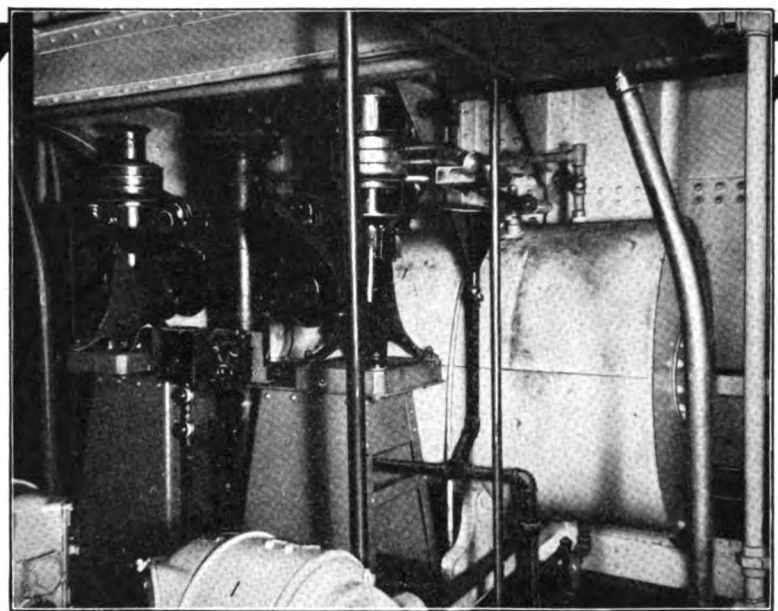
Cleaner Oil for Diesels of the Dredge "Sandmaster"



The illustration shows two De Laval Oil Purifiers on the Diesel-electric dredge *Sandmaster*. Experience has shown that these machines will greatly reduce bearing wear, save many bearing adjustments and effect a material reduction in lubricating costs.

THE new Diesel-electric sea-going hopper dredge *Sandmaster* of the Construction Materials Co., Chicago, has been called the most modern vessel of her kind in operation.

Like most other modern ships, she is equipped with De Laval Oil Purifiers—one for each of her two 600-hp. Worthington Diesel engines.

De Laval Oil Purifiers remove water, sludge, carbon and other impurities from lubricating oil by a centrifugal force several thousand times greater than the force of gravity. Purification is made more complete by the employment of the patented De Laval system of strata distribution. This scientific principle makes it possible to attain the highest degree of purification with a minimum expenditure of centrifugal force.

Hence, De Lavals can be built in accordance with sound engineering principles, to operate with a minimum of wear and upkeep cost.

The De Laval Separator Company

165 Broadway, New York **600 Jackson Blvd., Chicago**

De Laval Pacific Company, San Francisco

"Approved by American Bureau of Shipping"

De Laval OIL PURIFIERS

Please send Bulletin containing further information regarding the De Laval Oil Purifier as checked below:

Purification of lubricating oil.
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Reduce Paper Work

(*Continued from Page* 18)

quarantine officer, the immigration official boards the ship. He inspects all passports and sees that they compare accurately with the passenger list given him by the purser. The purser or his staff is usually required to muster the passengers and see that they are all ready to comply with the demands of the immigration inspection. And all passengers are compelled to comply with regulations issued by the department of agriculture against the importation of plant pests, which often means the prohibition of living plants, flowers, fruits and vegetables on the person of the passenger or in the passenger's baggage. Compliance with the prohibition law is also enforced. The detail of responsibility of the purser's staff in these regards accumulates without any proportionate showing on paper in the form of formal reports.

Then comes the customs regulations, which are heavy enough in themselves, but which are hardly as burdensome as the accumulation of the duties required under the other rules and regulations. Primarily the customs requires a statement of the baggage of passengers and the cargo of the ship for the purpose of administering the tariff act and the collection of duties.

Give Notice of Arrival

The law requires that a vessel shall report her arrival within 24 hours of reaching port and enter the ship within 48 hours. This is not strictly required today as the cargo is turned over to the customs immediately and sent to warehouse. With the advent of swift steamships permits are given to discharge immediately, and customs will accept boarding by a representative of that office as notice of arrival. But the manifest must be filed and with that document is included a statement of report of arrival.

Legally only two copies of the manifest are required but practically a steamship is required to provide four copies. The manifest is certified by the boarding officer from customs, the original being retained by the master of the ship to be used in entering the vessel, and the duplicate is forwarded to the collector. A third copy is made out for the comptroller of customs, and an uncertified copy is preserved for the discharging inspector. In addition the ship line usually preserves a copy at its offices for inspection of shippers. Failure to produce the manifest is punishable by a fine of $500, and failure to report the arrival of the ship is punishable by a fine of $1000.

Vessels returning from foreign ports must produce a certified copy of the crew list to the boarding officer. A copy of this list is forwarded by the collector at the port of entry to the collector at the home port of the vessel. Failure to produce the crew list is punishable by a fine of $400.

Customs officers may seal the sea stores while the vessel is in port and file with the surveyor a certificate of such stores under seal. If the ship then desires to unload at night or on a holiday application must be made, and permission may be granted upon the filing of a bond by the ship or her agents. Should a ship depart from a port before a report of entry is filed she may be fined $5000.

The regulations provide that the master of an American vessel arriving from a foreign port shall within 48 hours "make formal entry of the vessel at the customs house under such regulations as the secretary of commerce may prescribe, by executing the prescribed oath that the ownership of the vessel is as indicated in the register; that all mails placed on board his vessel before his last clearance were delivered at proper foreign ports; that the manifest is in accordance with existing law; and that a true and corrected copy thereof was delivered or mailed to the comptroller of customs having jurisdiction in the district. He shall deposit the original and one copy of the manifest (unless such copy has been taken up by the boarding officer); the vessel's crew list; its register or document in lieu thereof; the clearance and bills of health issued at the foreign port or ports from which it arrived; the pratique issued by the United States public health service on form 1940; and pay the tonnage tax, prescribed fees, and incurred penalties."

Foreign vessels are required to do the same with the exception that they are not required to file a crew list, nor to deposit the register but may be required to exhibit it to a boarding officer.

Manifests are rather formidable documents at times. When listing a large miscellaneous cargo the document may be so large that it might conveniently be wheeled about on a hand truck. Yet this is the document of which at least four copies must be compiled by the purser's staff before the ship enters port. The manifest must name the ports at which merchandise was loaded and ports of destination, description of vessel and port to which she belongs, names of owners and name of master; detailed account of all merchandise, with marks and numbers of each package, number and description of packages, such as barrel, keg, hogshead, case, or bag; names of consignees in accordance with bills of lading; names of passengers and class with their baggage, specifying number and description of each piece belonging to each, a list of baggage not accompanied by passengers; account of sea stores and ship's stores, and bunker fuel.

The purser and his staff must compile all this data fully and accurately. While separate lists of passengers and baggage may be filed and while the individual passengers may be required to compile their own declarations it is the duty of the purser to see that this is done and that the reports are turned over to the customs inspectors. The ship is likewise required to make a report of all repairs that have been made abroad as duty thereon is assessed at the first port of entry made by the vessel upon returning to America.

For cargo not to be removed at the first port of entry a bond is required. A special permit is made out to allow the sending of unpermitted packages from the wharf to public warehouse, or to allow unpermitted cargo to remain upon the wharf. In addition to all this, through the customs service the United States shipping board is allowed to collect certain reports from entering ships which gives the board statistical data that is desired by the bureau of research of the shipping board. On this form is reported data identifying the ship, her passengers and her cargo.

Enormous Increase in Paper Work

What is the general effect of this? Many steamship managements themselves are not fully aware of the true answer to that question. They have permitted things to run along in the usual grooves, allowing one thing after another to be added to the work of the purser, or master, until now before a navigation officer can qualify as a capable representative afloat he must have acquaintance with the fundamentals of accountancy, a knowledge of diplomacy, and the business acumen of a banker. While there is a tendency to centralize all this work in the hands of the purser, that does not after all relieve the master of responsibility. It means that the master must have a sufficient knowl-

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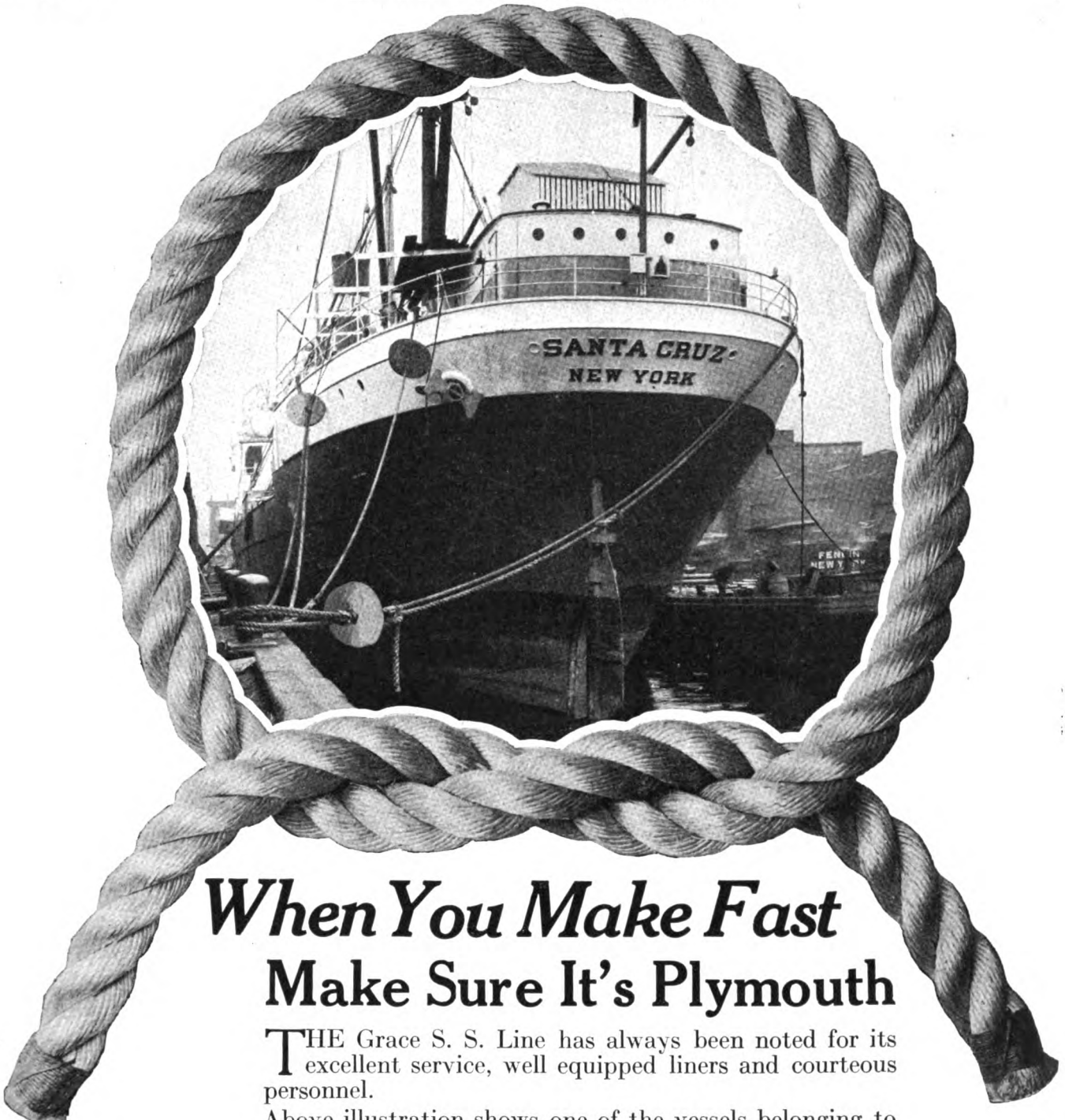

When You Make Fast
Make Sure It's Plymouth

THE Grace S. S. Line has always been noted for its excellent service, well equipped liners and courteous personnel.

Above illustration shows one of the vessels belonging to this splendid line moored to her dock in Brooklyn, N. Y.—needless to say, the mooring lines are Plymouth.

Regardless of what the service may be, you can always depend upon Plymouth Rope—Its long-wearing qualities insure manifold savings.

Make sure its Plymouth when you make fast.

PLYMOUTH CORDAGE COMPANY
North Plymouth, Mass. Welland, Can.

Ship chandlers everywhere handle Plymouth Cordage

PLYMOUTH *The Rope You Can Trust*

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edge to be able to direct the work of a capable purser's staff.

There is now required the making out of a radio report, asserting compliance with the statute which requires the carrying of radio operators. Then there is required a different report on the number and qualification of a certain group of immigrants. To make matters still worse a steamship company endeavors to keep the purser fully occupied by requiring his staff to handle the cash and payrolls. Others will require the filling out of a cargo stowage chart which can be used to facilitate the work of unloading. The result is that for a ship as small as 7000 tons at least two pursers are required to attend to the work, although the duties pertain chiefly to cargo and not over a hundred passengers. In the case of a large boat such as the LEVIATHAN, nine may be included in the purser's staff.

Should Agree on Simplification

America is probably not alone in being guilty of unduly burdening the steamship companies in this regard. Most of the smaller neighboring countries have found it convenient to draw up their regulations upon the pattern of the United States. This is especially true of the West Indies and Central American countries. The European nations have not deemed it necessary to pattern after us, but at that they are not much more lenient than the United States. Regulations adopted by one country which are made to apply to ships flying a foreign flag invite retaliation, and in such manner burdensome requirements are quickly imposed upon all shipping. This is very largely true of the paper work which is required of a ship entering most any port of the world, or at least any civilized port. It has grown to that point where it might be well to call an international conference for the purpose of simplifying and equalizing the requirements of all ports.

What's Doing Around The Lakes

AN ESTIMATE that $17,700,000 would be saved to Great Lakes vessel owners by the construction of regulating works in the St. Clair river is made by Col. H. F. Miller in a report to the harbor committee of the Chicago association of commerce. The Miller report says in part:

* * *

ADEQUATE regulating works in the St. Clair river would raise these levels three feet or more, even with a diversion of 10,000 cubic feet a second at Chicago. Thus the regulating work would give to this great fleet $590,000 for each tenth of a foot, or $17,700,000 a year for a minimum raise of three feet. The weirs would cost less than $1,000,000.

* * *

WHILE these bulk freighters are highly specialized boats developed by conditions of the lake strade, they are recognized as the most economical carriers in the world, and their rates are usually less than one-tenth of a cent per ton mile, and sometimes only a third of that amount. Rail rates, are ten times the water rates."

* * *

THE 1926 summer schedule of the Goodrich Transit Co., Chicago, assigns two steamers—INDIANA and CAROLINA—to the Chicago-Mackinac island run. Formerly the company operated only one steamer to Mackinac island and one to Washington island.

The ALABAMA and CITY OF GRAND RAPIDS are again on the Chicago-Muskegon run, the ILLINOIS and WISCONSIN on the Chicago-Milwaukee run, the CITY OF HOLLAND and CITY OF ST. JOSEPH on the Chicago-Holland run and the CITY OF BENTON HARBOR and CITY OF SAUGATUCK on the Chicago-St. Joseph-Benton Harbor run.

The whaleback excursion steamer CHRISTOPHER COLUMBUS, of the Goodrich line, is on her thirty-fourth year. After making daily excursion and moonlight trips at Chicago during the catholic eucharistic conference she went on her daily Chicago-Milwaukee schedule June 25.

* * *

WITH the exception of the CHRISTOPHER COLUMBUS, which will continue to use the old Goodrich line dock at the south end of the Michigan avenue bridge, all passenger steamers entering Chicago are now docking at the municipal pier thereby enriching the city treasury by some $60,000 annually. With the transfer of the headquarters of the Chicago & South Haven Steamship Co. to the pier, the Chicago river bridges no longer will be subject to daily lifts for excursion steamers. In addition to the South Haven and Goodrich lines the pier is being used by the Rutland-Lake Michigan Transit Co., Detroit & Cleveland Navigation Co., Chicago, Duluth & Georgian Bay Transit Co., Michigan Transit Co., Calumet Steamship Co., West Ports Steamship line and Universal Steamship Co.

* * *

THE Norwegian steamer WENCHITA took a cargo of automobiles, packing house products and machinery from Chicago early in June after a 25-day trip from New Port, England. At about the same time the Norwegian steamer JAN brought 1600 tons of French cast iron pipe for transshipment to Des Moines, Iowa. The JAN dropped some pipe at Detroit on the way to Chicago.

* * *

MUCH capital is being made at Chicago of a weather bureau report by D. D. Day, in charge of the climatological bureau, to the effect that lack of precipitation rather than the Chicago drainage canal is responsible for low water in the Great Lakes.

* * *

CONSIDERING the drainage areas of the four lakes, Superior, Huron, Michigan and Erie only," Mr. Day declares, "some unusually dry years occurred, even in the earlier part of the period from 1875 to 1925. In 1888 the average precipitation for this entire area was only 29.6 inches, and the preceding and following years were nearly as dry.

"The driest of the 50 years was 1895, when the average was 27.6 inches, and 1894 was likewise dry. The year 1910 with 27.8 inches was the second driest of the period, but both the preceding and following years had amounts above normal. Continuing the record to 1925, that year had the least precipitation since 1875, with an average of 27 inches only.

Examining the dry periods by groups of three years, one preceding and one following the driest year, 1887-89 had an overage of 30 inches, 1894-96 had 29.8 inches, 1923-25 had but 29.2, this last group being the driest in the 51 years and the six

(*Continued on Page* 46)

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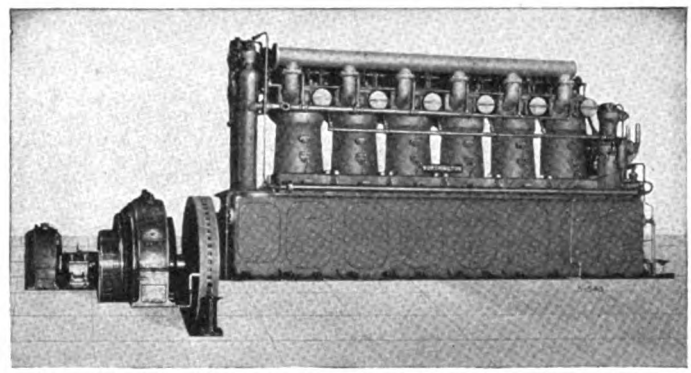
WORTHINGTON

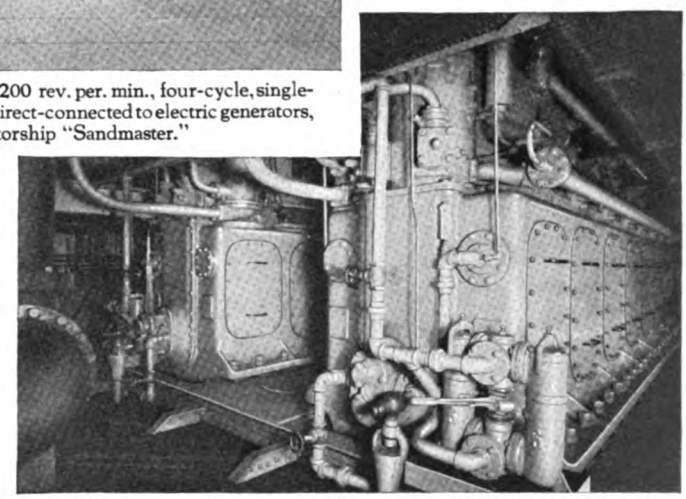
The M. S. "Sandmaster"

First Commercial Diesel-Electric Seagoing Hopper Dredge Built in the United States



One of the Worthington 600-hp., 200 rev. per. min., four-cycle, single-acting air-injection Diesel engines direct-connected to electric generators, supplied for the Motorship "Sandmaster."

A few of the Worthington auxiliary pumps—bilge, sealing and circulating—installed on Motorship "Sandmaster."



Worthington 600-hp. Diesel Oil Engines installed on "Sandmaster." These two engines furnish primary motive power.

THE Construction Materials Company, Chicago, Illinois, the country's largest producers of sand, has recently placed in service the twin-screw hopper dredge "Sandmaster."

Two 600-hp. Worthington Diesel Engines direct connected to electric generators furnish the power for driving the propelling motors, auxiliaries and the huge sand pumps used for loading and unloading. Both the propellers and sand pumps can be operated either from the engine room or the pilot house direct at will.

A smaller Worthington Diesel-electric generator set is provided to take care of the port power requirements.

The sand pumps are arranged to operate economically over a wide range of working conditions.

By using Diesel-electric power the owners anticipate better co-ordination of work between the crew on shore and on the vessel, a material reduction in the crew required and a substantial saving in fuel. In addition greater economy is expected through the elimination of delays in starting and stopping, getting under way, fueling and in making adjustments. Owners and operators will naturally follow the performance of this vessel with interest.

7668-5

WORTHINGTON PUMP AND MACHINERY CORPORATION, 115 BROADWAY, NEW YORK BRANCH OFFICES IN 24 CITIES

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What the British Are Doing

Short Surveys of Important Activities in Maritime Centers of Island Empire

A LEADING official of the United Fruit Co., Boston, Mass., has arrived in Britain for the purpose of contracting for the construction of six steamers for the fruit trade. During the week ended May 25 British shipbuilders had inquiries for the construction of seven new vessels. The signs are generally hopeful of a fairly good recovery in the shipbuilding industry. A favorable indication is the revival in the buying of ships, a number of important steamers having lately changed hands after remaining on offer for many months. Among other inquiries are a number from the Argentine government in connection with its naval program, which includes two cruisers, two destroyers, two gunboats and three submarines.

* * *

ONE of the effects of the coal strike has been the shutting down of the Middlesbrough South Bank shipyard owned by Smiths Dock Co. This will throw out of employment nearly 700 shipyard workers. The establishment has worked continuously since it was opened 17 years ago and the stoppage is due to the inability to obtain supplies of essential steel, such as plates and bars.

* * *

IT IS expected that the yard of Cammell Laird & Co. at Birkenhead, where six vessels are on the stocks will have to close down within three weeks, by which time it is expected the fuel stocks will be exhausted. Owing to the inability of Sheffield to supply castings and forgings in sufficient quantity to the shipyards, some of the shipowners have suspended repair work not immediately urgent.

* * *

E W. BEATTY, president of the Canadian Pacific railway is in this country, and states that his visit is for the purpose of placing orders worth £3,000,000 for two new "M" class liners and five freighters. The former will be similar in design to the MONTREAL, the MONTCALM and the MONTROSE, but they will be 1000 tons larger, making the total tonnage of 17,500 tons for each ship. The length will be 600 feet, the beam 74 feet and they are to be oil driven. The cargo boats intended for the service from London will be about 10,000 tons each, the design however, and the means of propulsion having yet to be decided upon. He states that he prefers to place the orders in England as he expects to get greater satisfaction from the English builders, although foreign competition in regard to cargo vessels must be an important factor. It is intended to increase the Pacific ocean service.

* * *

WORKMAN, Clark & Co., Belfast have secured an order from Furness, Withy for a high class passenger liner for the service between New York and Bermuda. The vessel which will be 530 feet in length will have internal combustion engines of the Sulzer type. This is the largest vessel placed for a long time with Workman, Clark.

* * *

A TWENTY-THOUSAND ton motor ship CARNARVON CASTLE, built by Harland & Wolff, Belfast for the South African service of the Union Castle line has returned to Belfast on completion of her trials on the Clyde. It is understood that the trials were successful in every way, the performances of the ship being equal to those of the ASTURIAS which has similar engines.

* * *

WILLIAM HAMILTON & CO., shipbuilders of Port Glasgow have completed within seven months the passenger and cargo steamer which has just completed its official trials. The keel of the vessel was laid within seven days of the signing of the contract, and notwithstanding adverse weather conditions was launched in 148 days. It was built to the order of the New York, Newfoundland & Halifax Steamship Co. Ltd., and is for their Red Cross line service between St. Johns, Newfoundland, New York and Bermuda. The steamer which is named the NERISSA, is 350 feet in length, 54 feet in breadth, 33 feet in depth to the upper deck and about 5500 tons gross. It has been specially strengthened for navigation in ice. The machinery supplied by David Rowan & Co. Ltd., Glasgow, consists of four cylinder triple expansion reciprocating engines, and has exceeded the designed speed of 15 knots. Although warships have been built in shorter time, this is believed to be a record for a passenger vessel of this size.

Around the Lakes

(*Continued from Page* 44)

preceding years also had amounts less than ormal.

"No matter how we may view the question of the distribution of precipitation in the lakes region during the last 50 years there can be but one conclusion—that there has been a marked falling off in the amount of precipitation received in recent years as compared with the amounts 40 to 50 years ago.

"There is, however, apparently no cause to suspect human agencies as being responsible for any important part of this lessening. Nor has any other area of the earth's surface suffered within recent times a permanent important change of climate, a fact indicated by the rate of forest growth, which appears to have been not greatly variable for hundreds or even thousands of years, and by the agricultural products which have in many cases remained unchanged since earliest times.

"It is, therefore, safe to predict that fluctuations in the amounts of precipitation over this region will occur in the future as in the past, and we shall again experience the generous distribution received during the earlier years of rainfall measurement in this region."

* * *

THE South Chicago Coal & Dock Co., Ninety-fifth street and Calumet river, South Chicago, Ill., has been organized to operate a vessel fueling service. James Playfair, formerly with the Great Lakes Transportation Co., is interested. D. S. Harding is president and T. F. McCarthy is in charge of sales and service. The establishment of such a service seems to be needed with growing shipping, domestic and foreign.

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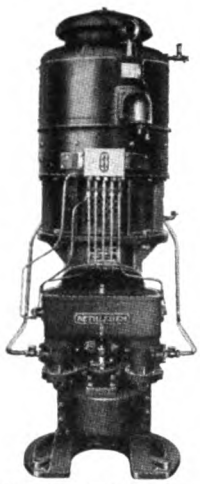
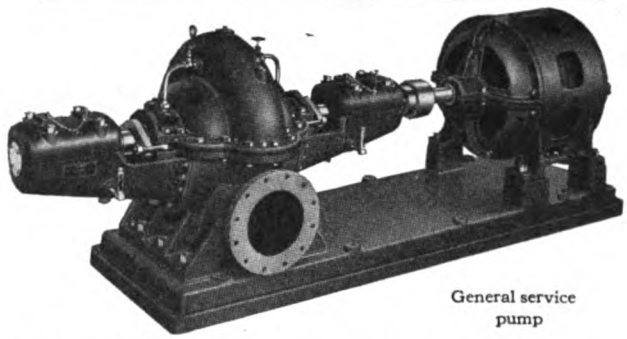
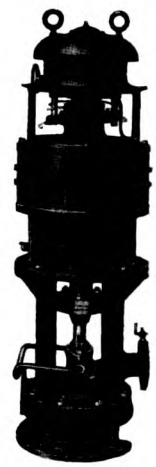
Electric-driven equipment *for* marine service



General service pump—self-priming



General service pump



General service pump

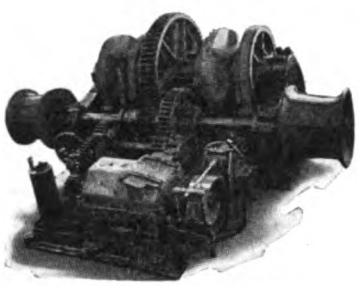
BETHLEHEM is prepared to furnish and install electric-driven marine auxiliary equipment

—for every auxiliary requirement of newly-constructed vessels

—for the complete conversion of the auxiliary equipment of vessels

—as part of a complete motorship conversion

—as individual electric-driven auxiliary units



Electric-driven windlass

Bethlehem Auxiliary Equipment Includes:

Electric-driven vertical centrifugal
- Fire and bilge pumps
- Fresh water pumps
- General service pumps
- Sanitary pumps

Electric-driven vertical reciprocating
- General service pumps
- Fuel oil supply pumps
- Oil transfer pumps
- Lubricating pumps

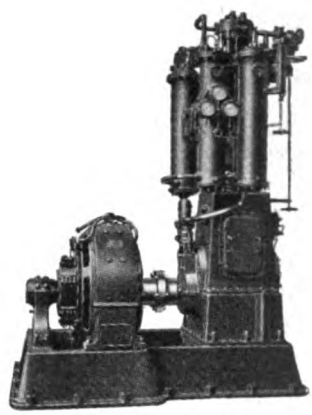
Electric-driven horizontal centrifugal
- General service pumps

Electric-driven Air compressors

Hydro-electric steering gears

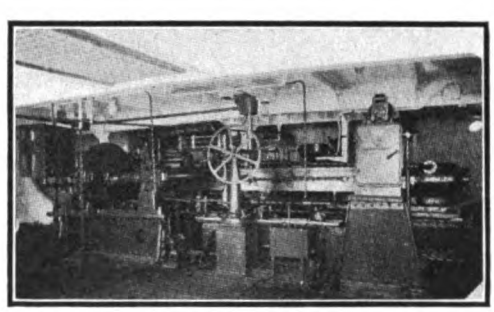
Electric-driven deck machinery

Small-unit type Diesel Oil Engines for Oil engine-generator sets

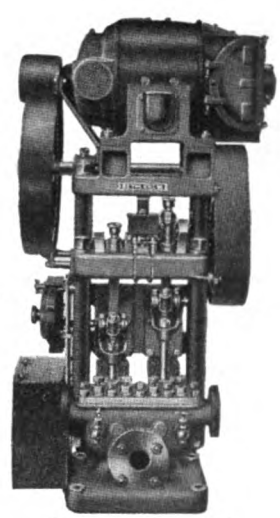


3-stage air compressor

Condensate or extraction pump



Hydro-electric steering gear



Reciprocating general service pump

BETHLEHEM SHIPBUILDING CORPORATION, LTD., BETHLEHEM, PA.

GENERAL SALES OFFICES: 25 BROADWAY, NEW YORK CITY

DISTRICT OFFICES: Boston, 100 Milk St.; Philadelphia, Widener Bldg.; Wilmington, Foot of West St.; Baltimore, South and Water Sts.; Cleveland, Union Trust Bldg.; Chicago, Monadnock Bldg.; San Francisco, Matson Bldg.

BETHLEHEM

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Build River Terminals

(*Continued from Page* 24)

low water level, the upper portion being quite steep. At a distance of 40 feet above the water is a berm bank. Both at the top of the bank and on the berm are laid railroad tracks connecting with the main railroads which serve Memphis. The conveyor type terminal leads from the top level to the water level, largely in a concrete tunnel equipped with two continuous link-hook-chain hauls which pull 2-ton industrial cars up and down the bank. A wharf boat is properly required at the foot of the incline. The Inland Waterways Corp., has practically abandoned use of this incline for interchange of through traffic between water and rail, but for local business it is considered useful. This system, however, is not well adapted to direct transfer between car and barge, nor is it usable for very long pieces such as steel rails. The Jones & Laughlin company, the Kelly Barge line and others are building their own terminals at Memphis on the Wolf river, just as the Carnegie Steel Co. is building at Baton Rouge, La., to use for further export of the steel products it is barging down the Ohio and Mississippi rivers from Pittsburgh.

Rail Connections Provided

The third type, the floating terminal, is used by the Inland Waterways Corp., which places the railroad cars directly alongside the barge. Such freight interchange terminals are in use at East St. Louis, Ill., as shown by the picture on the first page of this article; also at Cairo, Vicksburg and Memphis. At East St. Louis, which is across the Mississippi river and opposite St. Louis proper, standard gage railroad tracks are run diagonally down an incline from the main tracks on the edge of the bank. These double river-edge tracks extend out over the water, the 2000-ton barges of the Inland Waterways Corp. mooring alongside. This permits direct interchange of freight between barge and railroad car. A derrick float serves to handle the heavier pieces of freight.

The one at Memphis has railroad connections both up and down the river to the main trunk lines entering the city. The freight cars are run down the incline over the adjustable trestle and apron, and onto the transfer barge which has moored in front of it a wharf boat equipped with handling machinery. The river barge is moored on the outboard side of the wharf boat, this wharf boat thus being in between the river barge and the car float barge. This type of terminal places the cars and boats in proper position for the most economical handling. Its construction is justified where the amount of business is sufficiently large. It requires stand-by switching service and stand-by tug service. A considerable extent of river front is required for its construction.

These are considered pioneer efforts to provide suitable terminals on the rivers. They are expensive to construct and river municipalities find it difficult to finance similar installations. The United States engineers suggest Ohio river terminals which, to afford railroad connections also, may be constructed to cost up to $350,000 each and down to $25,000 each, depending upon the proposed amount of business to be done at a particular port. The city of Cincinnati proposes a river terminal that may cost $1,500,000, according to one plan. One such ideal plan for Ohio river warehouse and terminals proposed by the United States engineers rivers and harbors division is shown in Fig. 3.

The boards of trade at Wheeling, Paducah, Ky., Evansville, Ind., and elsewhere along the river have committees appointed to consider and plan for river terminal projects. The newspapers in Pittsburgh have begun the agitation for the city to initiate the building of a suitable municipal terminal.

River Cities Lack Terminals

At Pittsburgh, while there is one modern terminal warehouse with railroad connections owned privately by the Pittsburgh Terminal Warehouse & Transfer Co., yet the municipal wharfboat is the same one used for the past 20 years moored on the riprap wharf under the Smithfield street bridge, with no railroad connections but with railroads all around its harbor which extends for 27.2 miles. Similarly, the harbor of Cincinnati extends a distance of 23 miles along the Ohio river, but its principal unloading point is occupied by three privately owned wharfboats moored between the river and the roadways. None of these cities, including Louisville, owns or operates mechanical equipment for loading or unloading heavy freight. All employ hand labor, which is both expensive and slow. In Cincinnati for instance, cargo sometimes has to be carried by hand 200 feet from the stern of the vessel to the wharfboat and then back 100 feet for storage. In almost all cases, river towns have contented themselves with building riprap wharves from the top of the

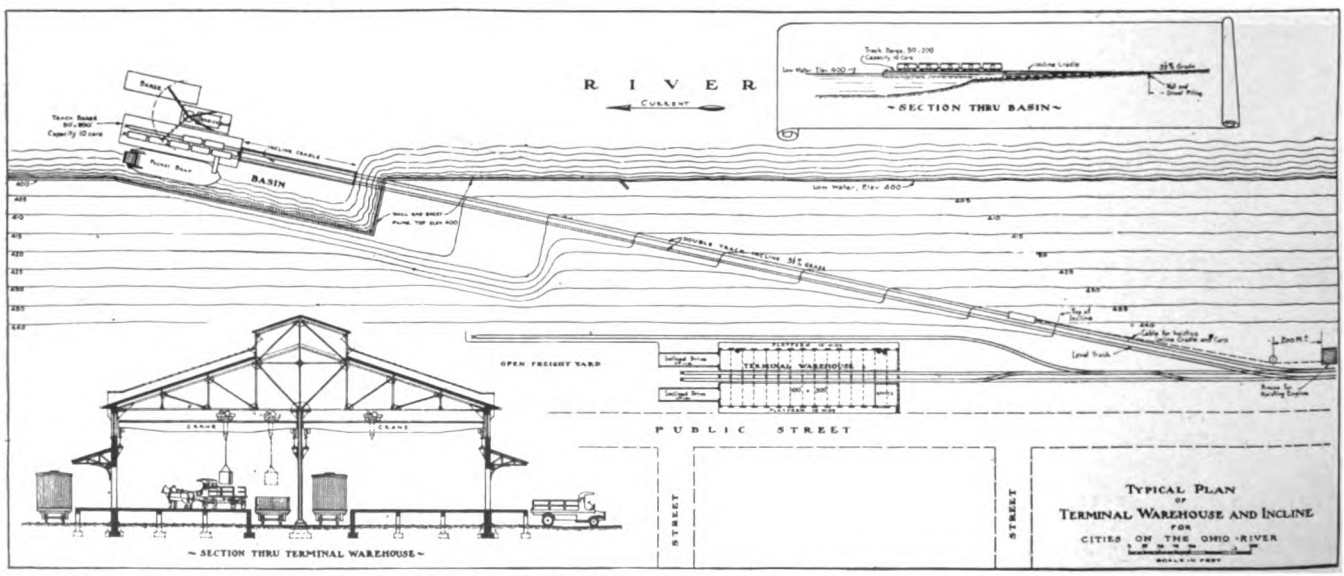

FIG. 3 IDEAL PLAN FOR OHIO RIVER WAREHOUSE AND FREIGHT TERMINAL, SUGGESTED BY THE UNITED STATES ENGINEERS

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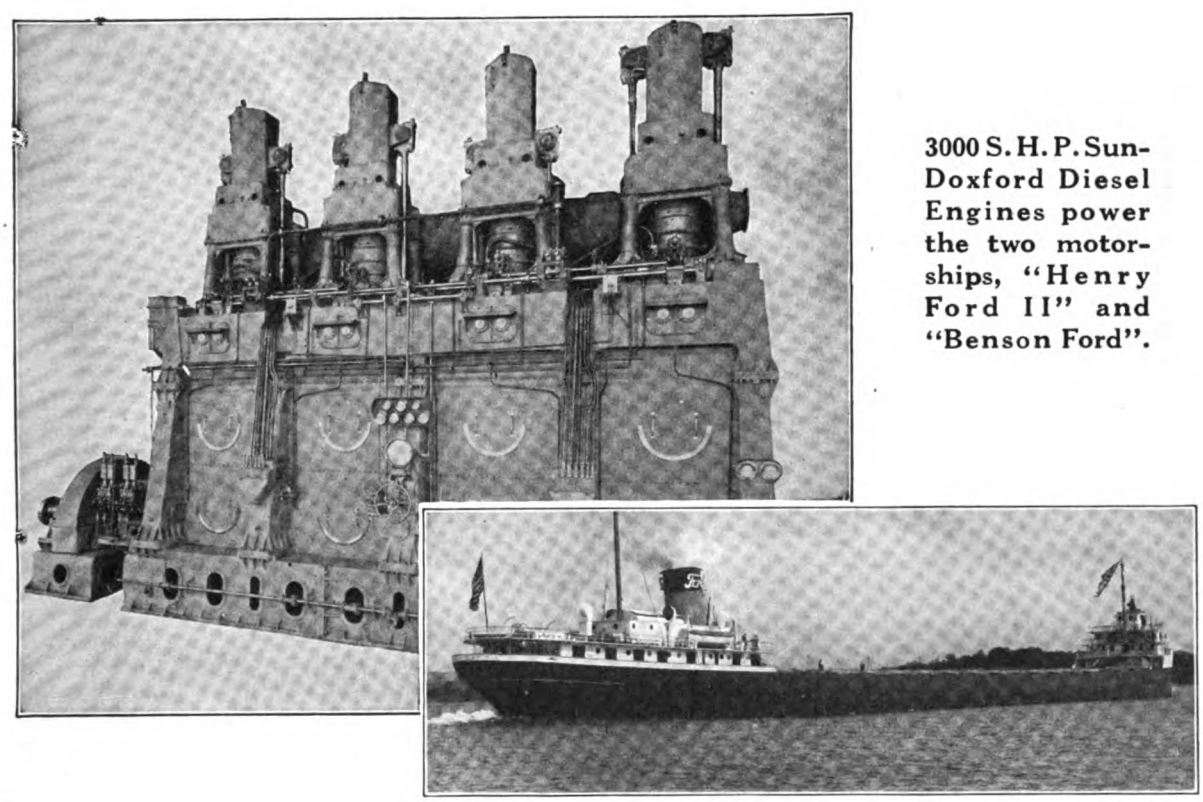
SUN SHIPBUILDING & DRY DOCK COMPANY

Builders of

SUN-DOXFORD DIESEL ENGINES

The Engines that Power

"HENRY FORD II" *and* "BENSON FORD"



3000 S. H. P. Sun-Doxford Diesel Engines power the two motorships, "Henry Ford II" and "Benson Ford".

M. S. "Henry Ford II"

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PAVED WHARF AND TYPICAL WHARF BOAT AT WHEELING, W. VA.

river bank to the water line, some of them with a wharfboat, privately owned, which the city charges a nominal rent for the privilege of mooring there. Steep grades, from 4 to 15 per cent, are available for team hauling of freight to the boats below the usually high banks.

At Pittsburgh's terminal there are no established terminal charges other than the wharf's rental of $1 per linear foot of river front and $2 charge per mooring. Col. H. W. Stickle, United States engineer in charge at Pittsburgh, offers these suggestions for a terminal to suit the needs of the public: (a) That it be under absolute municipal control; (b) that it have, where at all practicable, rail connection together with a belt line connection with all rail lines in the locality and the principal industrial concerns; (c) that it provide warehouse and storage capacity; (d) that it have suitable mechanical appliances for transfer of freight such as telpherage cranes and electric power elevators.

A Proposed Ideal Terminal

The ideal terminal proposed by Colonel Stickle is suggested for towns or cities where a large amount of freight could be received, shipped or transferred as shown in Fig. 3. It proposes a concrete wall at or near the shore line at pool full, with floor level at about flood stage height so that the first floor of the terminal would be about on a level with the adjacent streets. The building is 150 feet wide by 300 feet long, two stories high, with four elevators capable of lowering trucks to the level of the boat deck for direct loading or unloading on the elevator for storage on either the first or second floors. The concrete wall might be omitted and concrete encased steel construction be used as a support for the building proper. Two lines of railroad track run completely through the center of the building so that the car floor is on a level with the floor of the terminal. These tracks should connect with a belt line to the railroad systems of the district. Movable bridges or runways are to be built at intervals over the tracks for passage of motor trucks and wagons. The building should be provided with a telpherage system on both floors, traveling cranes on the first floor and cold storage rooms.

The landings at the various cities and towns are usually paved slopes owned by the municipalities, which in most cases charge a rental either to the boats for making landings or to the wharfboat if there be one at the site, or both. Where boats are charged for landing it is either at a given rate for each landing or per week or year. Wharfboats in most cases are required to pay a yearly rental to the municipality, and these boats subsist by making charges for the freight handled, consisting in some cases of a percentage of the freight charge, incoming and outgoing, or in other cases, in accordance with the weight of freight handled. Sometimes also there is a charge for freight bills collected, either on a percentage basis or at a given rate per week or month. The wharf boats vary in capacity from a few tons to about 250 tons and generally are owned independently of the freight carrying boats.

Present Charges Are High

Colonel Stickle suggests that "these charges in many cases are excessive, and if based on the weight of the goods handled, as is often the case, are out of all proportion to the actual freight charge for short distances. It would seem," he says, "that the first step in the improvement of the situation would be the merging of the ownership of the terminals and boat lines, or in the terminals being owned by the municipalities which can better afford to wait for returns on the investment."

The present general type of public terminals, that of paved public landings with wharf boats, is considered by engineering authorities as not so inefficient as often thought, and with some improvements and additions could be made to care for a considerable increase in traffic. The best existing terminal of this type is the one at Huntington, W. Va., shown in an accompanying illustration. This consists of a paved landing, a wharf boat, a warehouse on top of the bank with an incline track between the wharfboat and warehouse by which traffic is transferred on cars between the wharfboat and warehouse, and a railroad siding to the warehouse. This eliminates the necessity of hauling freight by wagon on the steep grades of the paved wharf, and also allows transferring freight between water and rail. This terminal except the paved landing is privately owned.

Loading and unloading charges on river boats differ depending upon the freight handled and the facilities. La-Belle Iron Works at Steubenville, O., by installing expensive equipment, has unloaded coal from barge to bins via oven and crusher at 17½ cents a ton. The equipment cost to install $246,000, and handles 200 tons per hour.

Actual Terminal Charges

Charges for terminals to the boat lines vary. At Pittsburgh there is no established charge other than the wharf's rental of $1 per linear foot of river front and $2 charge for mooring. On the Monongahela river 500 feet in length is reserved for trade, boats being permitted to land

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Toledo Shipbuilding Company Inc.

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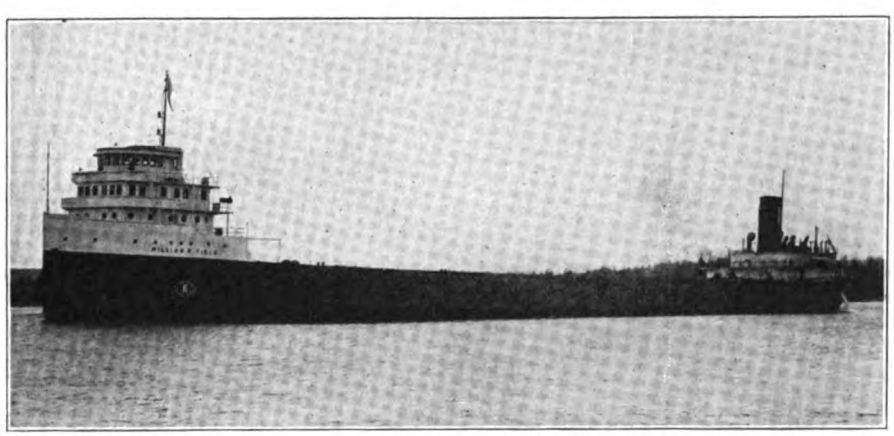

Steamer William K. Field

604 ft. Long, 60 ft. Beam, 32 ft. Depth. Deadweight Tonnage 12000.

OVER half a million tons of freight carried—forty six cargoes of ore and coal delivered in seven months and seventeen days by the steamer William K. Field.

This remarkable performance earned her the title, "Champion Freight Carrier of the World". During the season 1924 on the Great Lakes she registered a total of 552,014 tons. *An unprecedented accomplishment!*

The William K. Field is owned and operated by Reiss Steamship Company, Cleveland, Ohio. Her type of construction permits rapid loading and discharge of cargo. This was an important factor in her record breaking performance.

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without charge no longer than 24 hours. At Wheeling a rental of $75 per year for each wharfboat and 50 cents for each landing of boats is collected by the city. There also are charges by the Liberty Transit Co. for its wooden wharfboat of $1 to $2 for each landing of boats and of 10 per cent of the freight charge for outgoing and incoming freight. The Wheeling Wharfboat Co., with a wooden wharfboat, charges $10 per week per boat for landing and 2 cents per 100 pounds for outgoing and incoming freight. At New Martinsville, O., the Liberty Transit Co. charges $2 per landing and a charge of $5 per week for steamer at a wooden wharfboat. About 2 cents per 100 pounds is charged for incoming and outgoing freight over this wharfboat.

At Marietta, O., the municipality rental for wharfboats is $75 per annum and $2 a landing for regular steamers and 50 cents for gasoline or tramp boats. One wharfboat charges for handling ½ to 5 cents per 100 pounds, depending on the floor space occupied. At Parkersburg, W. Va., a handling charge of 2 cents per 100 pounds is collected. At Point Pleasant, charges vary from 10 cents minimum to 20 per cent of freight charges for incoming freight. At Gallipolis, O., the wharfboat company charges regular boats from $3 to $5 per week, and a handling charge of 10 per cent of freight charges on incoming freight is asked.

This seems to be the general system and rates all along the river.

At Charleston, W. Va., the city collects $535 per annum for exclusive control of the wharf frontage of 450 feet and wharf privileges. In other towns in the Cincinnati district, where wharfboats are not owned by packet lines, a charge of 3 cents per 100 pounds weight on both incoming and outgoing freight is charged. In addition to this, the actual cost of handling the freight from wharfboat to boat and vice versa is said not to be far from 50 cents a ton.

At Evansville, Ind., the Illinois Central railroad makes a charge for interchange of $3 a car if destined for other lines, $6.50 if transfer is made within the city switching limits, and no charge if car is routed over this company's main lines. The Louisville & Nashville railroad at the same point charges $3 per car if delivered to other lines, $4 if delivered within the city, and no charge when loaded over its own lines. At Henderson, Ky., the Louisville & Nashville charges $3.50 per car for delivery within city limits. Paducah, Ky., makes a charge of $1 to $4 per day to steamboats and $1.50 to gravel-boats per car load for interchange.

All of these cities need mechanical equipment also in order to handle heavy freight, having little or none at most of them.

It is considered improbable that the improved rivers in the district below Pittsburgh will carry the traffic hoped for until provision is made for combined rail and water shipments. Ten years ago at Cincinnati there was such rail and water interchange of coal. But the railroads undercut the boat carrying rates. Again at Joppa, Ill., there was such an interchange, but the equipment has fallen into disuse. Railroads at Cincinnati have quit giving the boat lines a division of the freight charges, prorating them as it is called.

Appointed Vice President Electric Storage Battery Co.

Announcement has been made by the Electric Storage Battery Co., Philadelphia, manufacturer of Exide batteries, of the appointment of H. B. Gay as a vice president. He will continue in charge of sales.

H. B. GAY
Vice president, Electric Storage Battery Co.

Mr. Gay is a graduate of Cornell university and entered the employ of the Electric Storage Battery Co. in June, 1901, as manager of the company's Baltimore office. In May, 1903, he was transferred to Cleveland as manager of the Cleveland branch.

After serving in that capacity until March, 1920, Mr. Gay was transferred to the factory at Philadelphia as acting sales manager. Four months later he was appointed to that position.

Now Consulting Engineer Westinghouse Company

Slightly more than a year after he was awarded the Elliot Cresson gold medal by the Franklin Institute in recognition of his scientific achievements, Francis Hodgkinson, for many years chief engineer of the South Philadelphia works, Westinghouse Electric & Mfg. Co., was appointed consulting mechanical engineer for

FRANCIS HODGKINSON

the organization as a whole, taking effect immediately.

The position of chief engineer of the South Philadelphia works has been discontinued and instead the position of manager of engineering has been created. A. D. Hunt, well known in engineering circles throughout the country, and for many years a member of the engineering staffs of the Westinghouse organization, was appointed to this position.

With the duties and responsibilities of Mr. Hodgkinson broadened according to the new arrangements, his great knowledge, which has earned fame for him both in this country and abroad, will be made available to all of the operations of the company. His prime duty will be to act as consulting engineer in all design problems and other engineering activities at South Philadelphia.

In addition, however, he will contribute his effort in a consulting capacity on any mechanical problems arising under the necessities of the company at any other location. Likewise Mr. Hodgkinson, when required, will assist the sales department in the presentation of engineering subjects and will also be available in the same capacity to the Westinghouse Electric International Co. continuously engaged in engineering problems in many different foreign countries.

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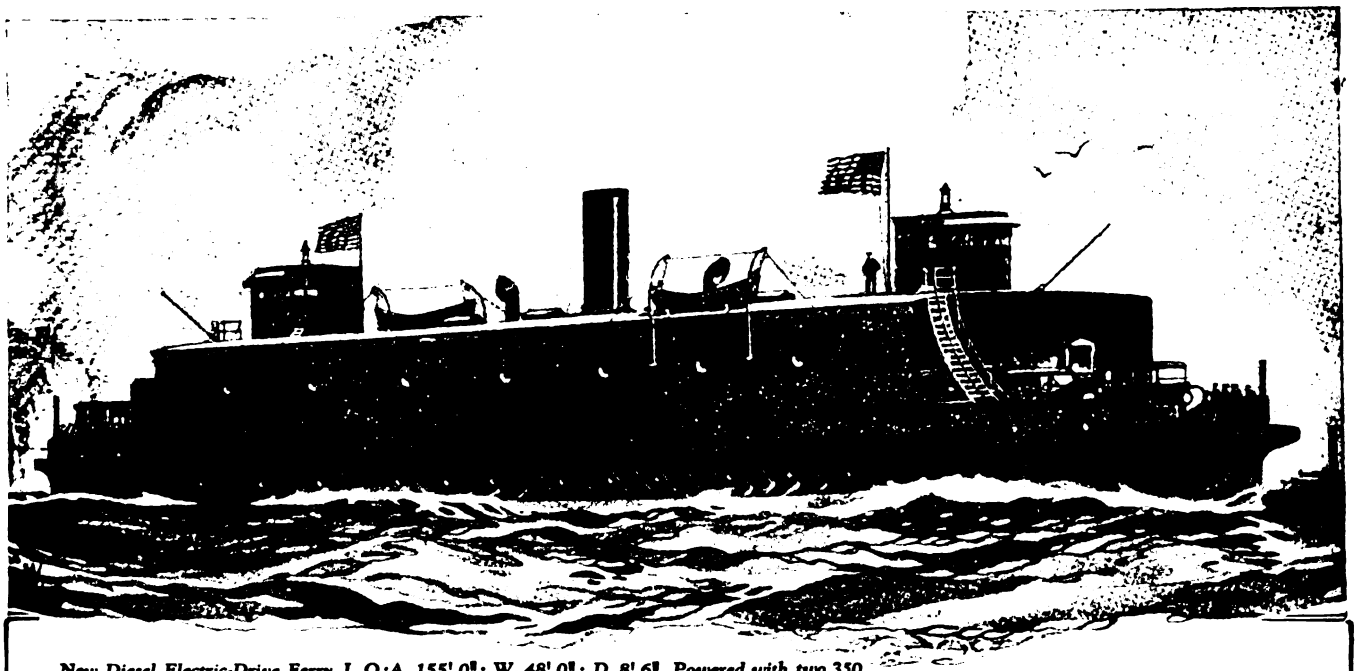

New Diesel Electric-Drive Ferry, L.O.A. 155' 0"; W. 48' 0"; D. 8' 6". Powered with two 350 B.H.P. Nelseco Diesel Engines, Type 6 MI-18. Capacity 50 automobiles. Speed about 13 M.P.H.

Six New York Electric Ferries to use Nelseco Diesel Engines

Contracts have just been signed for the construction of six electric-drive ferry boats, each of which will be powered with two 350 B. H. P. Nelseco Diesel Engines.

These new vessels—the first of this type to operate in New York harbor—will be put in service this fall and will be used in transferring automobiles, trucks and auto busses from 23rd Street, Manhattan, to Weehawken and Under Cliff, N. J.

Owners: Electric Ferries, Inc.

Shipbuilders: American Brown-Boveri Electric Corp.

Engine Builders: **New London Ship & Engine Co.**

Naval Architect: Eads Johnson, M. E., Inc.

The selection of twelve Nelseco Diesel Engines for this installation is only natural in view of the long life and remarkably low fuel consumption of these dependable power units.

If you want help with your power problems, write for Pamphlet MR, or better still, make an appointment with one of the Nelseco engineers.

NEW LONDON SHIP & ENGINE COMPANY
Groton, Conn., U. S. A.

Nelseco Diesels are built under M. A. N. patents; in 4-cycle, single-acting type, from 100 to 850 H. P.; in 2-cycle, double-acting type, from 1,000 to 10,000 H. P.; mechanical or air injection; suitable for direct current, alternating current, rope, belt or direct drive.

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Low Lake Levels

(*Continued from Page 26*)

paratively short distances. On the Great Lakes a general average of 11½ miles per hour is perhaps the most economical. But it sometimes happens that someone gets the idea that a mile or so more would be a great advantage. What is likely to happen? The absorbing power at the terminals, and occasionally the supply at the other end, get out of step with the result of accompanying delays that more than offset the gain in speed. The extra coal consumed is quite a considerable item of expense when it is remembered that the power increases as about the cube of the speed, or 10 per cent more speed means 30 per cent more coal. Reciprocating engines and Scotch boilers with forced draft are capable of a certain flexibility with respect to occasional overloading; but to make a regular practice of forcing the machinery to a power much above its normal rating, is simply running the risk of somewhat expensive repairs sooner or later. Such has actually been the case in some vessels recently. Sometimes it also happens that in the mad race, we have the spectacle of vessels lying at the docks toward the latter part of the year for lack of cargoes, and it is a little difficult to see what has been gained by rushing things earlier in the season.

Possible Savings Large in Aggregate

Adding up all of the above possibilities, there is no doubt that savings can be made which will certainly help to bridge the gap that at present exists between the loads carried today and those possible on deeper drafts.

With existing vessels and their present equipment, perhaps only minor savings can be accomplished, but it may be well to look ahead to the time when future vessels are to be built. That somewhat superior being, who can run off all kinds of figures to show how far marine engineers are behind the modern land power plant station, will probably cause some moments of uneasiness, but cold facts as observed from a critical analysis of ledgers may help to restore confidence.

I realize that the above suggestions may bring down on my head all kinds of criticism, from being "fundamentalist" to a "back number." I think I am as conversant with modern developments in marine and even land practice as many others, even to the extent of diesel engines, electric propulsion, geared turbines, and paddle wheel types, each of which has its proper place in the marine world today. But—please note, I said proper place: and conditions of service, methods of operation, cargo to be carried, proper speed, possible limitations of draft and, hence, propellor design, handling of vessels, necessity for continuous and reliable service over a few months of the year, to mention only a few of the requirements, are things that should be given grave consideration before adopting methods or devices that may have proved successful under entirely different conditions.

In addition to the above, the main question before lake shipping men today is the urgent necessity of the regulation of lake levels and the prevention of any developments that tend to lower the same. At present it would seem inevitable that freights must gradually increase, but should more draft be available in the future, not only no harm, but possibly great benefits, can come from a thorough invesigation of things as they exist today

Four Carferries Pending

The Ann Arbor railroad is in the market for a new carferry taking 3000 tons of steel, probably similar to the ANN ARBOR No 7 completed last year at Manitowoc Shipbuilding Corp. This ferry is 360 feet long by 56 feet beam and is engined with two reciprocating steam engines and has four Scotch boilers.

The Wabash railroad is in the market for four carferries taking about 8000 tons of steel. It is likely that these ferries will be somewhat similar to the carferry recently completed for the same company by the Manitowoc Shipbuilding Corp. This ferry is 370 feet long by 67 feet beam and is 21 feet 6 inches deep. Four reciprocating steam engines drive four propellers, two at each end. Steam is furnished by 6 Scotch marine boilers 13 feet 9 inches in diameter by 11 feet 6 inches long at 160 pounds per square inch. R. H. Reynolds, marine superintendent of the Ann Arbor railroad supervised the construction.

Federal Shipbuilding Co.

The Federal Shipbuilding & Dry Co. on June 1 announced the removal of its sales office to the general offices and works of the company at Lincoln highway, Kearney, N. J. Its former mailing address for inquiries and all mail has been changed to Kearney, N. J.

Authorize Nine Ships for Coast Guard

One of the most important happenings for American shipbuilders recently, was the passing by the house and the senate and the signing by President Coolidge of a bill appropriating $9,000,000 for the building of ten new vessels for the United States coast guard. Naturally the keenest competition will be developed when bids are asked for, but it will mean some much needed business for the shipyards.

Cramps Awarded Contract

The navy department announced on June 7 that a contract had been awarded William Cramp & Sons Ship & Engine Building Co. for the building of one light cruiser. Bids were opened for the building of this scout cruiser to be known as SALT LAKE CITY on April 1. A sister vessel to be named PENSACOLA is to be built at the Brooklyn navy yard. The machinery for the latter vessel also will be built in a private yard. Cramp's bid was as follows:

For one ship complete and engines for both ships, contractor's design of machinery, $10,900,000. For one ship complete, and engines for both ships, with navy design machinery, $10,580,000.

Bids Asked for Barges

The Inland Waterways Corp., a government corporation, under the control of the United States army, will receive bids on July 16 at the offices of Cox and Stevens naval architects and marine engineers, 341 Madison avenue, New York City, for three steel towboats and for 15 steel barges. These boats are all wanted, it is understood, for use on the upper Mississippi river.

New Ferryboats

Late in May, the Southern Pacific Co., 65 Market street, San Francisco, asked for bids on, it is understood, five ferryboats somewhat similar to the KLAMATH. The new ferries are to be of the diesel electric type and are to be powered with four 400 brake horsepower diesel engine generating sets supplying current to a 1250 shaft horsepower electric motor. The dimensions of the new ferryboats will be 256 feet over all; 234 feet between perpendicular; 44 feet 10 inches in breadth; and 63 feet 6 inches in breadth over guards; and 19 feet 4 inches in depth.

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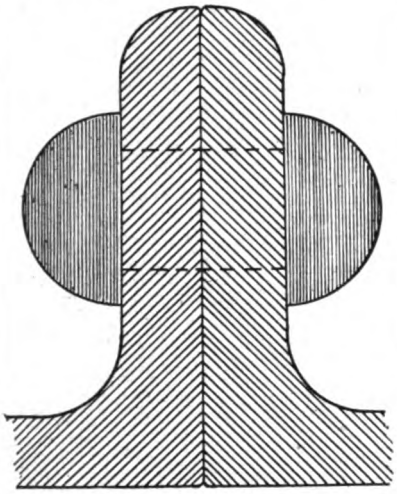
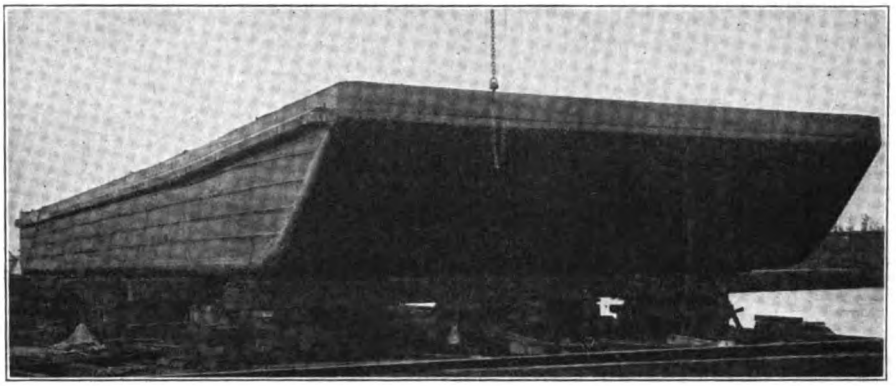


All Steel Channel Deck Lighter for U. S. Engineers, completed at Rome, N. Y., June, 1925. Note Sheer at ends.



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Channel Steel Barge Company, Rome, N. Y.

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W. G. Bartenfeld, Great Lakes Representative, Lorain, Ohio

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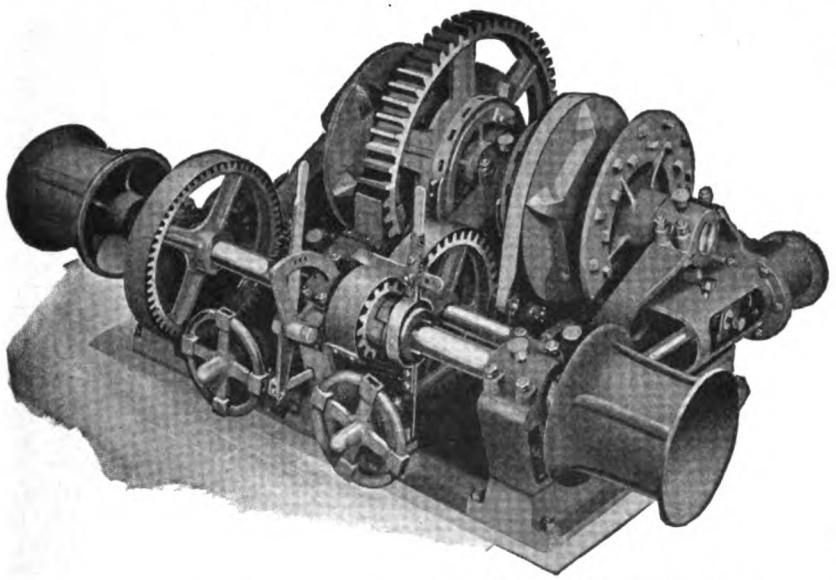
The "Superior" Spur Geared Windlass



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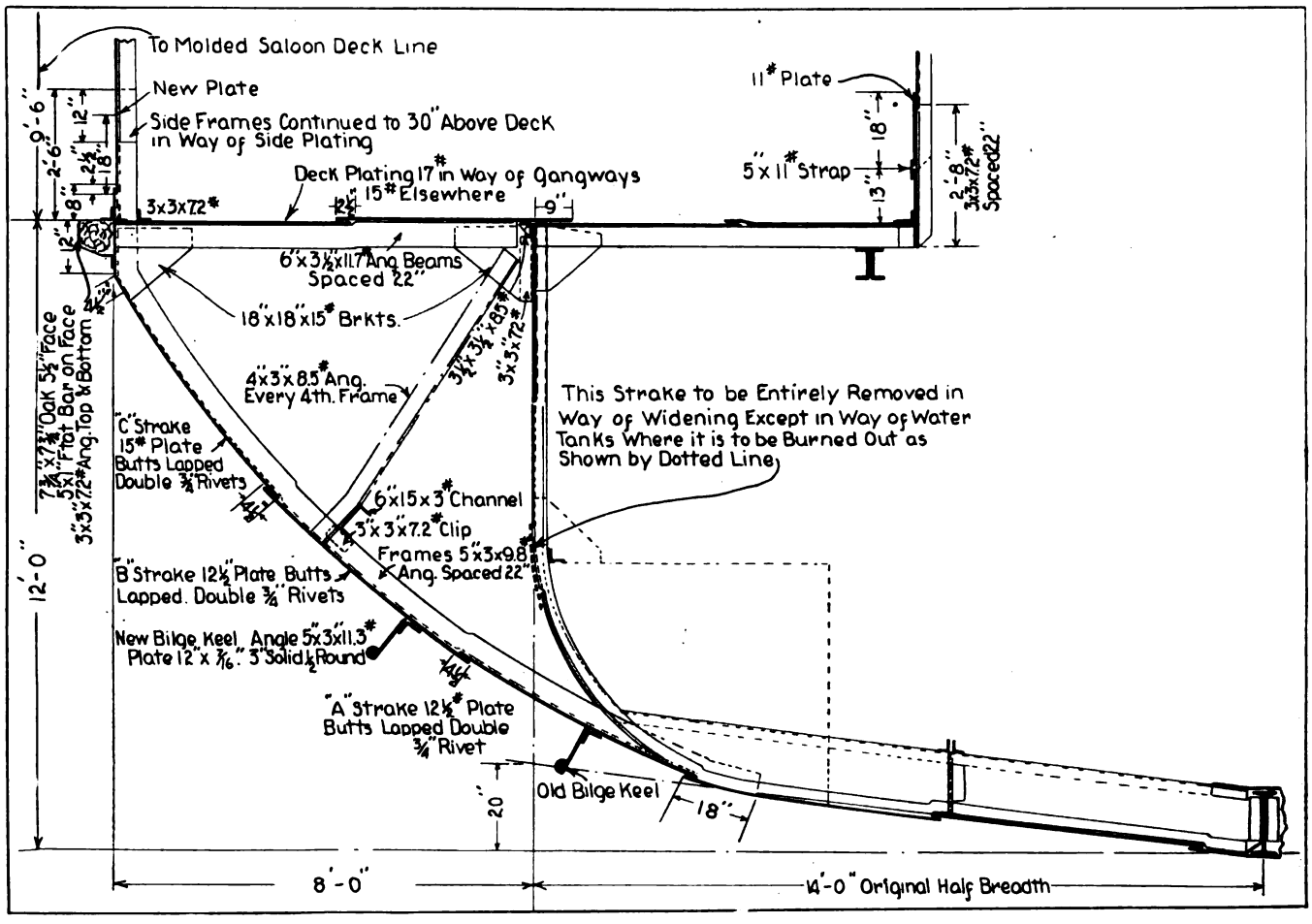
To Molded Saloon Deck Line
New Plate
Side Frames Continued to 30" Above Deck in Way of Side Plating
Deck Plating 17# in Way of Gangways 15# Elsewhere
3x3x7.2#
11# Plate
5"x11# Strap
6"x3½"x11.7 Ang. Beams Spaced 22"
18"x18"x15# Brkts.
4"x3"x8.5# Ang. Every 4th. Frame
3½"x3½"x8.5#
3"x3"x7.2#
This Strake to be Entirely Removed in Way of Widening Except in Way of Water Tanks Where it is to be Burned Out as Shown by Dotted Line
"C" Strake 15# Plate Butts Lapped Double ¾" Rivets
6"x15x3# Channel
3"x3"x7.2# Clip
Frames 5"x3"x9.8# Ang. Spaced 22"
"B" Strake 12½" Plate Butts Lapped. Double ¾" Rivets
New Bilge Keel. Angle 5"x3"x11.3# Plate 12" x ⅞". 3" Solid ½ Round
"A" Strake 12½# Plate Butts Lapped Double ¾" Rivet
Old Bilge Keel
18"
8'-0"
14'-0" Original Half Breadth
12'-0"
9'-6"
2'-6"
2'-8" Spaced 22"

Midship section of steamers MACKINAW CITY and SAINTE IGNACE showing how the structural problem of widening them 8 feet on each side was solved and carried out

Capacity State Ferries

(*Continued from Page* 27)

clear headroom of over 8 feet. This makes the entire deck available for any passenger car and gives ample space on the forward deck for trucks or high loads of any kind.

The increased beam makes room for about fourteen additional cars, making a total capacity in their present condition of 45 to 50 cars for each ship.

Lengthening the vessels, which was the first change made on these boats, is a not uncommon operation, but increasing the beam of a boat over 50 per cent by bustling out each side, is very seldom done.

The ships were first placed in dock and the upper works all cut adrift and blocked up to the required height. One strake of plating was removed at the lower turn of the bilge and the new frames lapped down on to the old floors. The old sheer strake was not disturbed, the deck beams for the added width being bracketed on to the outside of the sheer strake.

The new shell and deck plating were lapped on to the old plating and carried out in the usual way. The maximum beam of the deck was carried as far forward and aft as possible, but the frames forward and aft were faired into the old lines of the hull, so that when the vessel was in dock just before floating, there was nothing in the appearance of the hull to indicate that it was not originally built to the final dimensions.

After the steel work of the hull was completed, the top side plating, including the bulwarks and the forecastle sides were moved out to the new deck line and riveted in position, the cabin and forecastle decks being extended to meet the new line.

At this time a steam windlass and heavier anchors and chains were fitted to each ship. The ships, as finally altered, make very satisfactory and commodious automobile ferries and give no impression of the various stages through which the structure went before completion.

There have been no material alterations to the propelling machinery, so that the vessels, in spite of the amount of work which has been done on them, have cost the state much less than they would have paid for new ships of the same capacity.

Made Traffic Manager

R. U. Parker, formerly connected with the Dominion Atlantic railway, has been appointed passenger traffic manager of the Eastern Steamship Lines, Inc., and will have headquarters at the Eastern Steamship pier on India wharf, Boston. He will also represent the Boston & Yarmouth Steamship Co., Ltd., in the same capacity. This company has increased its service between Boston and Yarmouth.

Thomas Quinn 1860-1926

On April 18, Thomas Quinn, well known for many years in marine circles on the Great Lakes, died at his home in Buffalo. He was born in Limerick, Ireland, March 4, 1860 and came to this country when 16 years of age. For 26 years he was marine superintendent for the E. L. Hedstrom Coal Co., Buffalo, in charge of the fuel lighters Shawmut. After this he went with the Interlake Steamship Co. He was with this company for 10 years, the last two of which he was pensioned. He was one of the most popular men along the water front.

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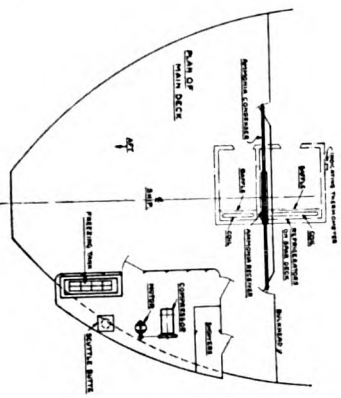

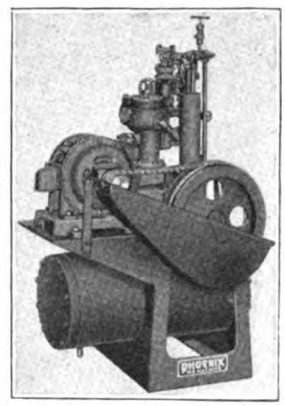

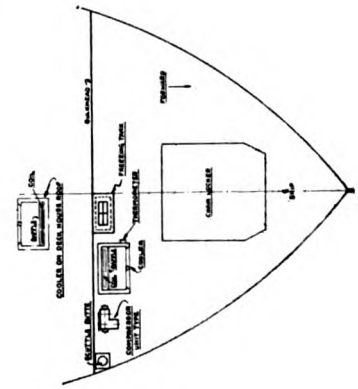

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Embodying new and valuable improvements which mean greatly increased efficiency, economy of upkeep and freedom from care.

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Every major section can be easily and quickly dissembled and assembled. The new Phoenix automatic Stuffing Box is a novel and decidedly valuable contribution to the science of refrigeration.

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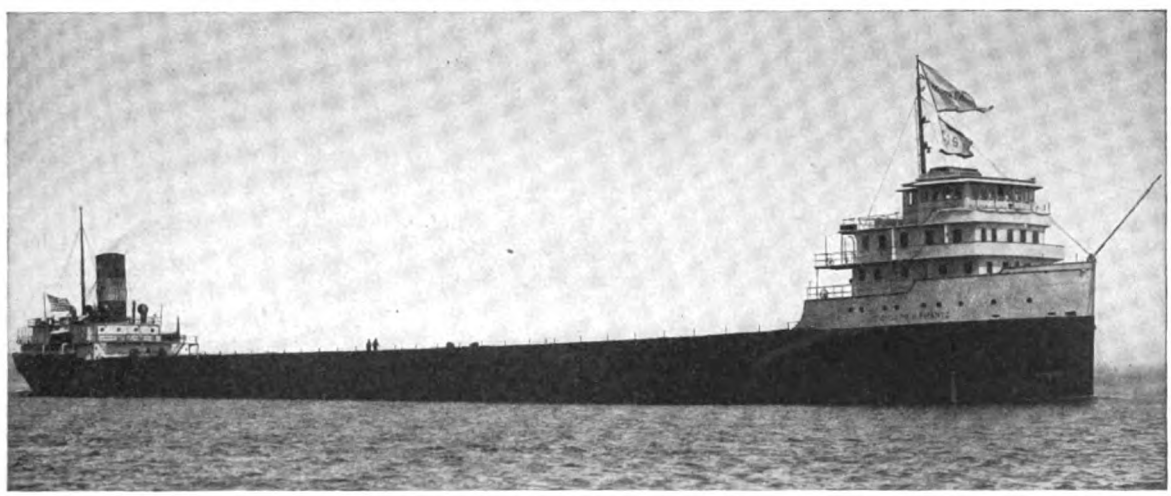

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Marine Department
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Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	448	1,856,777	538	2,126,788
April	483	1,967,964	538	2,248,081
March	523	2,090,347	511	2,033,938
February	404	1,591,273	454	1,826,886
January	407	1,671,761	463	1,883,094
December	431	1,706,900	510	2,022,775
November	473	1,902,745	488	1,886,587
October	450	1,920,797	530	2,229,801
September	449	1,960,366	505	2,117,563
August, 1925	469	1,889,239	493	1,933,228

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	97	215,829	69	151,287
April	80	185,401	61	135,919
March	107	264,754	72	158,858
February	78	184,715	52	113,763
January	76	206,081	52	136,040
December	88	194,283	53	142,885
November	83	216,604	44	116,468
October	74	193,534	49	128,906
September	85	211,019	51	113,257
August, 1925	84	197,743	65	146,144

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	134	277,009	111	261,878
April	101	285,245	77	210,542
March	117	356,432	62	178,217
February	92	263,475	42	136,613
January	97	287,335	55	156,167
December	96	270,869	67	210,652
November	115	341,258	59	147,554
October	105	312,455	73	206,347
September	114	328,275	78	196,632
August, 1925	136	349,514	104	246,275

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	19	49,894	17	47,016
April	23	48,836	32	73,947
March	34	97,413	31	88,462
February	23	64,150	23	66,660
January	26	78,508	27	81,917
December	31	85,651	29	75,072
November	25	85,616	23	33,194
October	17	27,630	20	34,668
September	19	36,082	22	45,258
August, 1925	16	37,391	17	36,191

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	7	25,057	6	20,806
April	8	28,449	5	23,480
March	15	47,557	8	34,025
February	8	29,622	7	30,033
January	5	20,355	6	24,221
December	16	52,660	6	27,149
November	6	16,446	8	26,811
October	9	35,405	6	21,232
September	7	21,260	7	22,410
August, 1925	3	14,019	5	17,041

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	35	128,351	43	152,890
April	17	66,789	29	107,892
March	21	85,073	38	134,432
February	23	81,440	33	114,147
January	22	84,722	26	97,068
December	23	86,443	40	144,392
November	28	108,796	37	140,784
October	26	98,371	41	144,397
September	28	103,812	43	158,098
August, 1925	16	62,202	23	81,712

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	120	369,729	121	355,443
April	107	330,401	110	326,649
March	120	382,983	119	362,256
February	102	304,714	99	288,640
January	97	302,341	88	264,249
December	105	314,958	109	332,721
November	106	334,997	99	312,705
October	99	302,522	92	293,425
September	93	264,455	109	310,029
August, 1925	109	319,469	104	319,035

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	40	107,858	140	368,515
April	21	45,875	126	305,549
March	22	40,160	140	395,038
February	20	48,377	108	298,756
January	26	69,958	96	256,019
December	24	57,907	100	279,570
November	27	78,573	81	254,439
October	26	51,328	91	248,017
September	39	94,940	85	237,628
August, 1925	70	183,064	122	348,475

Savannah

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1926	43	102,126	41	99,244
February	40	97,908	46	121,792
January	38	103,029	38	106,472
December	37	101,726	35	91,141
November	37	112,158	38	117,064
October	45	125,766	47	126,452
September	50	137,030	39	103,408
August	34	77,027	39	87,455
July	38	97,332	34	91,981
June, 1925	26	60,788	27	60,924

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	114	126,089	109	120,597
April	88	101,331	88	99,227
March	102	117,292	90	114,917
February	70	85,607	69	88,229
January	80	110,684	81	110,084
December	89	121,193	88	113,996
November	96	113,222	89	107,091
October	77	91,125	75	90,953
September	76	96,356	73	91,119
August, 1925	72	90,106	70	87,924

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	99	183,795	95	191,442
April	109	205,035	98	178,025
March	125	228,481	115	221,022
February	100	153,884	92	188,057
January	109	212,005	78	150,384
December	104	183,941	89	173,371
November	101	191,490	95	185,722
October	88	258,529	84	161,648
September	80	149,289	76	171,432
August, 1925	83	172,872	75	152,613

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	39	159,755	44	163,718
April	51	215,641	47	191,161
March	38	166,536	45	184,067
February	42	168,308	45	182,920
January	45	182,889	50	204,058
December	47	201,460	55	231,787
November	47	199,055	46	196,343
October	52	203,951	49	207,153
September	42	173,157	43	183,917
August, 1925	31	135,105	35	144,874

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	287	753,621	284	772,138
April	248	626,277	296	694,673
March	295	754,863	300	751,054
February	255	717,048	250	691,747
January	241	659,776	243	652,209
December	273	750,625	279	764,022
November	261	645,709	232	629,728
October	252	729,058	276	789,419
September	248	655,367	248	680,446
August, 1925	257	675,405	253	664,064

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
May, 1926	5	18,321	10	20,514
April	11	37,459	12	27,166
March	18	64,432	20	49,897
February	10	35,629	10	21,945
January	8	27,610	13	27,237
December	14	38,441	10	26,597
November	17	50,093	13	31,111
October	22	68,795	21	55,903
September	13	25,853	22	47,838
August, 1925	19	34,089	16	43,588

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1926	39	89,426	71	208,388
January	36	92,194	75	235,699
December	38	83,590	97	300,872
November	34	107,440	83	266,458
October	43	98,168	96	302,581
September	33	95,954	72	225,194
August	28	80,524	41	133,058
July	36	100,359	52	141,316
June	47	120,423	57	177,647
May, 1925	46	114,702	53	151,098

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	133	376,720	112	351,123
April	149	434,866	130	370,158
March	139	371,793	128	305,105
February	119	363,875	111	306,161
January	130	381,785	115	335,041
December	149	392,707	109	310,852
November	181	398,459	123	337,483
October	261	365,552	183	268,611
September	115	284,493	205	259,437
August, 1925	161	344,646	160	295,220

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	154	605,068	116	428,814
April	155	583,821	167	602,680
March	144	571,040	135	511,010
February	133	506,778	134	506,317
January	154	544,882	139	528,315
December	135	532,691	153	593,556
November	124	491,579	142	547,770
October	138	517,798	136	511,844
September	135	487,872	144	535,301
August, 1925	154	579,197	154	549,844

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1926	20	60,276	36	95,754
April	....	.....	....	.....
March	....	.....	....	.....
February	21	65,930	32	70,814
January	23	75,232	32	108,118
December	31	86,254	24	71,883
November	40	117,506	42	120,597
October	30	86,652	32	95,695
September	26	101,387	31	88,654
August, 1925	22	66,176	23	68,827

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Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

STEAMSHIP company, and not construction company engaged in repairs, was held in the case of Drowne v. Great Lakes Transit Corporation, 1 F.(2d) 339, to be required to provide suitable guard for manhole on ship, and liable for death of employee of construction company falling into manhole.

* * *

A SHIP owner is bound to send his ship to the loading port, even if it is obvious that she cannot arrive there before the cancellation date, and the charterer cannot be compelled to say how he will exercise his option until that date arrives. * * * If the vessel does not proceed to the loading port, that fact will make no difference to the charterer, if he exercises his option to cancel; if, on the contrary, he exercises his option to load, he will have a right of action for damages against the ship owner for breach of the obligation to carry." Sanday v. United States Shipping Board Emergency Fleet Corp., 1 F(2d) 390.

* * *

WHILE vessels, automobiles, engines, and trains of cars must at times be backed, as well as propelled forward, it is universally conceded," it was stated in the case of GLASGOW MARU, 1 F.(2d) 503 "that backing is a dangerous maneuver, and requires the utmost skill, especially in a narrow channel. Vessels should not back out of a slip until all precautions have been taken."

* * *

BILLS of lading, it was decided in the case of Eastern Steamship Company v. 170,040 50/60 bushels of wheat, 1 F.(2d) 558, are negotiable instruments and import title of the specified commodity and a right to transfer or assign the same from one to another, and the vessel, for violation of conditions binding upon her, is liable for injury sustained. Ordinarily, the court said, she may assume the property transported by her will be accepted by the care party on arrival, pursuant to arrangements between the latter or the owner or shipowner, and generally that unloading will occur without unusual delay or detention unless extraordinary conditions intervene.

* * *

A MARITIME lien, being secret and unrecorded, is stricti juris, and cannot be extended by judicial construction, analogy, or inference. Such liens, said the court in the case of EURANA, 1 F.(2d) 684, are an exception to the rule that all creditors have equal rights in the property of their debtor. They rest upon an entirely different principle. The maritime lien had its origin in the desire to protect the ship and the mechanic's lien in the desire to protect mechanics and materialmen. Maritime liens, therefore, cannot be conferred on the theory of unjust enrichment or subrogation.

* * *

WHERE the government sold vessels for a stated price, and consumable stores therein were separately appraised and paid for on delivery, on retaking the ships under contract for default in payment, it cannot claim that vessels included such stores then on board, but they are the property of the purchaser.—United States v. Miller, 2 F. (2d) 248.

* * *

THE master of the privileged of two meeting vessels will not be held in fault for maintaining her course and speed, it was decided in the case of NEWPORT, 2 F. (2d) 255, so long as it is possible for the other to avoid her, or until he has some distinct indication that the other vessel is about to fail in her duty. The court further held that the privileged of two steamships meeting at sea on a clear day was not chargeable with contributory fault for a collision between them, brought about by the gross negligence and fault of the other vessel, which had no one in the pilot house, on the bridge, or on lookout, because her master kept his course and speed, though his signals were not answered and he could see no one on duty on the other vessel.

* * *

IN AN action at law for injury under section 33 of the Merchant Marine Act, the seaman bears a different relation to the ship than does the cargo, or a passenger, or a stranger, and his rights rest on a different basis; in an action by a seaman under such section, the issues must be determined according to the principles of common law, and are the injury, the proximate cause thereof, and the measure of compensation, and allegations in the complaint of acts of negligence of defendant, unless such negligence was the proximate cause of the injury, are immaterial. —Lorang v. Alaska Steamship Company, 2 F. (2d) 300.

* * *

THE statutory requirement of "reasonable diligence" on the part of one furnishing parts or supplies to a vessel to ascertain the authority of the person in possession to bind the vessel is not met by reliance on the mere statement of such person that he is the owner.—MORGANZA, 1 F.(2d) 964.

* * *

THE primary object of section 2 of the Seamen's Act of March 4, 1915, requiring seamen to be divided into watches, it was decided in O'Hara v. Luckenbach Steamship Company, 1 F.(2d) 923, is to fix hours of service and prevent overwork, and a vessel having three quarter-masters divided into three watches of eight hours each, and three lookouts divided into three similar watches, the remainder of the crew doing ordinary shipwork for eight hours during the daytime and being off duty at night, did not violate the Act, and the quartermaster is not entitled to a discharge thereunder because of such arrangement.

* * *

IT WAS said in the case of SILVIA, 2 F.(2d) 99, 102, that a captain sailing a ship up a thoroughfare such as the East River is naturally concerned more with the craft in the water than that moored along the bank, and yet, said the court, they must not be carelessly forgotten. "The speed in midstream may not be careless," using the words of the court, "although that speed near the shore would be careless. The East River does not exist solely for barges and lighters, important as they are, nor does it exist solely for the larger steamer. The rights of all must be respected, and each captain must use reasonable care in the management of his vessel not to do that which is reasonably certain to cause damage in the ordinary cause and effect and sequence of events. The duty also rests on the smaller craft moored alongside of the bank, that they be moored in a reasonably safe way, and that they be maintained in such reasonably good condition as to withstand the ordinary knocks and emergencies which are so constantly to be encountered, and which there is every reason to apprehend, and that those in charge be ordinarily experienced and competent."

* * *

THE action of the engineer of a boat moored in East River, which had been injured by being bumped against a stone bulkhead and had begun to fill, casting her loose on a flood-tide half an hour after the injury, causing her to suffer further damage, is not excusable as an error of judgment in extremis, it was held in the case of SILVIA, 2 F.(2d) 99, 102, but was an act of negligence. "If under such circumstances a careless act is excused on the ground that it was simply an error of judgment, in extremis," said the court, "then every case of negligence could be excused on this exceptional ground, and negligence would be proved as evidence of prudence. The law in regard to errors of judgment is based on different circumstances from those here indicated."

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Modern River Dredge Is Launched

The Rodgers Sand Co. recently witnessed the launching of its giant sand and gravel dredge from the Dravo Contracting Co.'s ways at Neville island. The launching took place at noon, when Miss Ruth Rodgers, daughter of W. B. Rodgers Jr., president and general manager of the company, christened the new addition to the Rodgers fleet CAPTAIN, in honor of her late grandfather, Capt. W. B. Rodgers who was known as the dean of the rivers. F. R. Dravo, president of the Dravo Contracting Co.; R. M. Dravo, J. H. McCrady, J. Frank Tilley, secretary of the Pittsburgh Coal exchange, and friends were present. Luncheon was served later in the pavillion in Dravo park.

The new sand digger is 145 feet long, 33 feet wide. It will dig to a depth of 45 feet and will be equipped with 86 cast iron buckets. The new digger when completed will be one of the most modern of its kind.

R. L. Tomlinson has succeeded W. O. Whitney as sales manager of the Bruswick-Kroeschel Co.

Order Diesel Engines for Diesel Electric Ferries

The American Brown Boveri Electric Corp., Camden, N. J., has placed an order with the New London Ship & Engine Co., New London, Conn., for 12 diesel engines. This company on June 2 received an order for six diesel electric ferryboats for the Erie Railroad Co. and the engines are intended for this order.

The Italian shipyard Stabilimento Technico at Trieste is to build a 24,000-ton liner for the Lloyd Sabaudo.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to June 18, 1926 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH BUSINESS SLOW

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 100 lbs.	††Finished steel	REMARKS Freight Offered
Liverpool	1s 9d	$0.50	$0.30	0 20	$0.40	$0.75	$7.00T	Dull
London	1s 9d‡	0.50	....	0.20	0.40	0.75	7.00T	Dull
Oslo	$0.13	0.45	0.50	0.27	0.42½	0.85	7.00T	Slow
Copenhagen	0.13	0.45	0.40	0.26	0.42½	0.85	7.00T	Slow
Hamburg	0.13	0.35	0.40	0.20	0.37½	0.75	8.00T	Fair
Bremen	0.14	0.35	0.40	0.18	0.37½	0.75	8.00T	Good
Rotterdam and Amsterdam	0.13	0 32½	0.45	0.18	0.35	0.70	7.50T	Fair
Antwerp	0.11	0.32½	0.35	0.20	0.35	0.70	7.50T	Quiet
Havre	0.11	0.50	0.35	0.27½	0.40	0.75	8.00T	Very slow
Bordeaux	0.11	0.50	0.35	0.27½	0.40	0.75	8.00T	Very slow
Barcelona	....	12.00T	0.30	10.00	—12.00T—		8.00 to 15.00T	Slow
Lisbon	0.20	0.65	0.40	7.00T	—20.00T—		7.00T	Fair
Marseilles	0.15	0.55	0.30	6.00	—20.00T—		5.00T	Slow
Genoa	0.17	12.50	0.40	7.00	—20.00T—		10.00T	Fair
Naples	0.17	12.50	0.40	7.00	—20.00T—		10.00T	Fair
Constantinople	0.27	17.00T	0.75	0.42	—20.00T—		9.00T	Good
Alexandria	....	17.00T	0.75	0.42	—20.00T—		9.00T	Good
Algiers	....	0.75	0.50	0.40	—20.00T—		10.00T	Poor
Dakar	....	15.00	....	14.00T	—24.00T—		10.50T	Good
Capetown	9.00T	18.00	....	13.00T	—20.00T—		11.00 to 18.00T	Very good
Buenos Aires	....	20.00T	....	....	—20.00T†		8.00T	Very slow
**Rio de Janeiro	....	22.00T	....	8.00T	20.00 to 22.00T†		7.00 to 7.70T†	Very slow
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Very slow
Havana	0.22½*	0.50	....	0.30*	0.61*	1.33*	4.00*	Fair
Vera Cruz	0.35	0.30	0.35	0.25	0.52½	1.05	0.30 to 0.35	Fair
Valparaiso	....	1.07	....	0.70	0.45	0.80	10.00T	Fair
San Francisco	....	0.35 to 0.70	....	0.50 to 1.10	....	....	0.25 to 0.80	Fair
Sydney	....	18.00T	1.25	1.18T	18.00-24.00T		9.00-12.00T	Light
Calcutta	....	....	0.45	10.00T	—16.00T—		10.00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Landed. ††Heavy products limited in length. *Extra charge for wharfage.
**Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion.

From North Pacific Ports to	Lumber Per m. t.
San Francisco	$4.00 to 5.00
South California	4.00 to 5.00
Hawaiian Islands	9.50 to 10.50
New Zealand	16.00 to 18.00
Sydney	13.00 to 13.50
Melbourne-Adelaide	13.00 to 14.00
Oriental Ports	8.50 to 9.50
Oriental Ports (logs)	12.00 to 15.00
Peru-Chile	13.00 to 14.50
South Africa	16.50 to 18.00
Cuba	14.00 to 15.00
United Kingdom	75s to 85s
United Kingdom (ties)	70s to 80s
Baltimore-Boston range	$10.00 to 11.00
Florida Range	No rates
Buenos Aires	14.00 to 15.00
	Flour and Wheat
U. K. and Continent (gross ton)	30s to 31s
Oriental Ports (net tons)	$3.75 to 4.25

NOTE: Tourist trade to France very good at this time.

Principal Rates To and From United Kingdom

	s	d
Grain, River Plate to United Kingdom	18	3
Coal, South Wales to Near East	—	–
Coal, United Kingdom to Buenos Aires	—	–
Manganese Ore, Poti to Philadelphia	$3.85	

	s	d
Pig iron, United Kingdom to New York or Philadelphia	—	–
Iron ore, Bilbao to Cardiff	5	10
Iron ore, Huelva to Phila. or Balto	10	6

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. Owing to the coal stoppage in Britain no outward freight rates or bunker prices for coal or pig iron are quoted.

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Aug. 17, 1925	5.00@6.00	1.71½	5.50c
Sept. 19	5.50@6.00	1.71½	5.00
Oct. 17	5.00@6.00	1.70½	5.00
Nov. 18	5.50@5.60	1.70½	5.00
Dec. 18	5.60	1.70½	5.00
Jan. 2	5.50@6.25	1.75@1.80	5.25
Mar. 18	5.60@5.80	1.80½	5.50
Apr. 22	5.25@5.60	1.80@1.81½	5.75
May 19	5.25@5.60	1.80½	5.88
June 18, 1926	5.50@5.60	1.80½	6 08

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
Sept. 19, 1925	5.25@5.50	1.55@1.61½	5.00c
Oct. 17	5.25@5.50	1.71½@1.74½	5.15@5.65
Nov. 18	5.40@5.65	1.71½@1.74½	5.15@5.25
Dec. 18	5.15@5.50	1.71@1.74½	4.89@5.15
Jan. 20	5.50@6.25	1.71@1.79	5.00@5.65
Feb. 18	5.80	1.78@1.86½	5.14@5.50
Mar. 18	5.00@5.25	1.80@1.86½	5.40@5.65
Apr. 22	5.25	1.77@1.86½	5.90@5.93
May 19	5.25@5.70	1.82@1.86½	6.15@6.38
June 18, 1926	4.90@5.15	1.80@1.86½	6.15@6.43

Other Ports

Boston, coal, per ton	$7.21
Boston, oil, f. a. s., per barrel	$1.80
Hampton Roads, coal, per ton, f.o.b., piers	4.50@4.75
June 11—Cardiff, coal, per ton	—s –d
London, coal, per ton	—s –d
Antwerp, coal, per ton	—s –d
Antwerp, Fuel oil, per ton	77s 6d
Antwerp, Diesel oil, per ton	97s 6d
British ports, Fuel oil	72s 6d
British ports, Diesel oil	87s 6d

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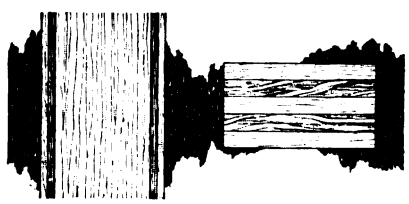
Layers of wood welded together
with a water resistant cement
for

Bulkhead Construction
Ceilings, Walls, Door Panels
Drawer Bottoms

furnished in all hard and soft woods. Will not warp or buckle, stands by itself. Requires no backing. Requires ⅓ less paint than composition material, by actual test. Low first cost.



5 ply construction of Weldwood in hard woods. Welded with same water resistant cement used in U. S. Aircraft propeller construction.

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Technical service of our engineers at your service. Catalog with prices on request.

Weldwood reduces the weight above the water line. Ample stocks maintained for quick deliveries. Naval architects can choose from stocks at New York and Detroit.

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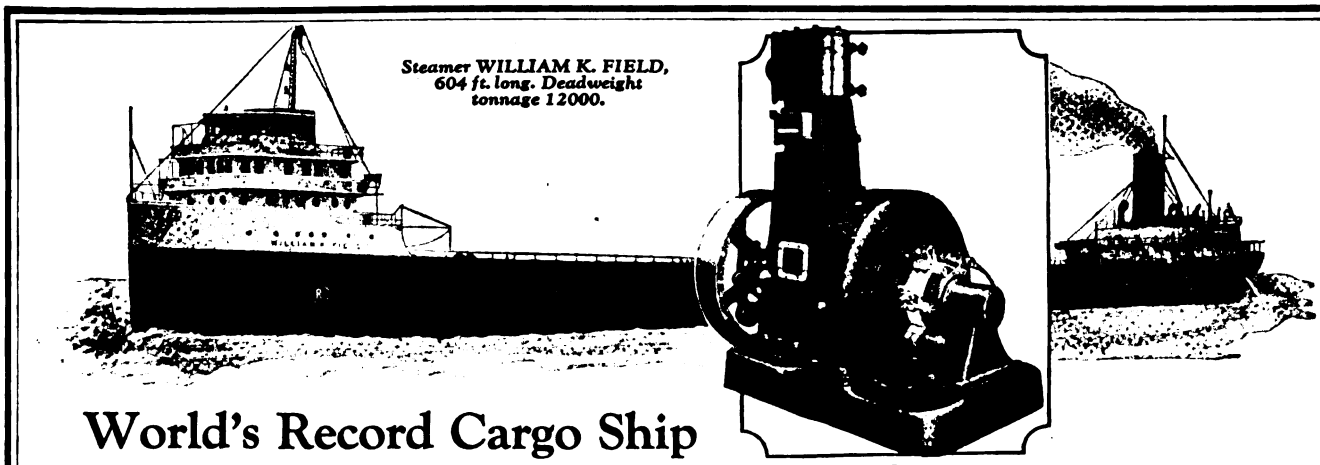

Steamer WILLIAM K. FIELD, 604 ft. long. Deadweight tonnage 12000.

World's Record Cargo Ship Has ENGBERG Generating Sets

THE Steamer WILLIAM K. FIELD, built by Toledo Shipbuilding Company, owned and operated by Reiss Steamship Company, carried over half a million tons of freight in practically seven months.

Such a record decisively shows the reliability of ENGBERG Generating Sets as absolutely correct performance was necessary. Furthermore, the confidence which the builders and owners had established in these machines from previous experience was again fully justified by actual operating results.

We will gladly send descriptive catalogs:
No. 105. Direct Current Generating Sets.
No. 601. Direct Current Generators.
No. 302. Vertical, Enclosed, Self-oiling, Engines.

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ENGBERG

Engberg THE STANDARD FOR EFFICIENCY-DURABILITY-SERVICE

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Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
Araguaya	Jan. 30	Ashore	Narrows	Floated
Aros	Feb. 1	Disabled	Helsingborg	Machinery
Amsterdam	Feb. 5	Ashore	Paskallavik	Not stated
Alexa	Feb. 5	Collision	Rotterdam	Not stated
Altai Maru	Feb. 7	Ashore	Fotaumum Pass	Bottom
Argentina	Feb. 9	Fire	St. Vincent	Not stated
Anna Maria	Feb. 9	Fire	Panemi	Not stated
Apache	Feb. 15	Disabled	Norfolk	Propeller
Annie C. Ross	Feb. 19	Ashore	Pensacola	Floated
Araguaya	Feb. 22	Collision	New York	Not stated
Alarado	Feb. 20	Ashore	Progreso	Not stated
Antinous	Feb. 26	Aground	Fort Morgan	Floated
Adamello	Mar. 2	Ashore	Constantinople	Floated
Burma	Feb. 4	Stranded	Tree Island	Not stated
Brockley	Feb. 4	Collision	River Thames	Port side
Basso Piave	Feb. 5	Collision	Rotterdam	Bulwarks
Barrhill	Feb. 8	Fire	St. Vincent	Not stated
Balmes	Feb. 19	Ashore	South Pass	Not stated
Brosund	Feb. 27	Ashore	nr. Hals	Floated
Brilliant	Mar. 1	Collision	Everett	Not stated
Brask	Mar. 3	Disabled	west of Valeatia	Rudder stem
Bangkok	Feb. 18	Collision	Pernambuco	Not stated
Boeton	Feb. 19	Fire	Brest	Nos. 1 and 2 holds
City of Agra	Feb. 3	Aground	Cochin	Floated
Corness	Feb. 4	Collision	River Thames	Not stated
Cairnvalona	Feb. 3	Sank	Portland	Not stated
Cairnhill	Feb. 7	Fire	Padang	Conside a le
Clan Kenneth	Feb. 8	Collision	nr. Altona	Stem
Chapullepic	Feb. 9	Hvy. weather	Not stated	Disabled
City of Detroit	Mar. 3	Collision	Detroit	Damaged
Charterhurst	Feb. 16	Collision	Constantinople	Not stated
Colonel Keith	Feb. 20	Aground	Ship Channel	Not stated
Canada Maru	Mar. 8	Fire	Kobe	Not stated
Capillo	Feb. 15	Aground	Not stated	Not stated
Dias	Feb. 4	Ashore	Tonsberg	Floated
Dinorah	Feb. 9	Ashore	Northcoats Point	Not stated
Dagny I	Feb. 9	Collision	Hull River	Not stated
Darmas	Feb. 25	Collision	Bosphorus	Not stated
Eleftherios M. Tricoglu	Feb. 1	Aground	Burtonport	Considerable
Egyptian	Feb. 3	Collision	Off Newark	Considerable
Emilia S. Perez	Feb. 4	Collision	Gijon	Damaged
Erholm	Feb. 6	Fire	Willemstad	Considerable
Esterel	Feb. 11	Collision	Off Tilbury Jetty	Portside; leaking
Elmpark	Feb. 11	Collision	New York	Plates
Eidsbottem	Mar. 1	Ashore	Cartagena	Not stated
Errington Court	Feb. 15	Hvy. weather	Not stated	Considerable
Elisabeth	Feb. 26	Aground	n. Funen	Floated
Elsina	Feb. 26	Ice	Off Faerder	Sank
Formica	Feb. 4	Aground	Sandhamn	Not stated
Firenze	Feb. 8	Fire	Genoa	Not stated
Favonian	Feb. 23	Fire	Halifax	Not stated
Georgia	Feb. 1	Collision	Alexandria	Not stated
Goldenfels	Feb. 3	Fire	Antwerp	Considerable
Grace De Dieu	Feb. 11	Aground	Point Coubre	Not stated
Glenardle	Feb. 19	Ice	e. Cape Race	Bows
Guiding Star	Feb. 16	Aground	nr. Londonderry	Not stated
Glenmoor	Feb. 23	Fire	Durban	Cargo
General Belgrano	Feb. 26	Collision	nr. Blankenese	Ashore
Hookerk	Feb. 4	Ashore	nr. Gluckstadt	Not stated
Hornchurch	Feb. 3	Collision	off Humber	Port side
Husvik	Feb. 4	Disabled	Cardiff	Engine
Hunan	Feb. 1	Ashore	Hainan Straits	Not stated
Highland Pride	Feb. 11	Collision	off Tilbury Jetty	Not stated
Harald Caspar	Feb. 10	Aground	Sable Island	Not stated
Hornelen	Feb. 11	Aground	Grenholmen	Total loss
Heian Maru	Feb. 12	Aground	Okujiri Hokkaide	Total loss
Havana Maru	Feb. 15	Collision	off Ambrose Chan.	Damaged
Homeric	Feb. 16	Collision	Constantinople	Lost anchor
Horaisan Maru	Mar. 5	Capsized	Grays Harbor	Sank
Hilda	Feb. 23	Disabled	Plymouth	Shaft
Imica	Feb. 10	Sprang leak	Not stated	Sank
Iping	Feb. 10	Struck rocks	nr. Ichan	Hull
Jean Baptiste	Feb. 8	Sprang leak	off Kentish Knock	Sank
Jarl	Feb. 11	Ashore	Bergen	Floated
Johanna	Feb. 15	Disabled	se Landsort	prop. lost
Johanne Dybwad	Feb. 25	Disabled	Bishop Rock	Not stated
Kastoria	Feb. 12	Aground	Monningsvaag	Not stated
Kajah	Feb. 23	Aground	New York	Not stated
Karmoy	Feb. 20	Ashore	Progreso	Not stated
Kamouraska	Feb. 17	Fire	Halifax	Not stated
Kenwood	Feb. 23	Ashore	Boston	Bottom
La Guardia	Feb. 1	Struck bridge	Cette	Stem
Larchbank	Feb. 10	Struck sub. object	Columbia River	Prop.
Lillian K. Marshall	Feb. 20	Fire	Coenties Slip	Cabin
Leon Jurado	Feb. 23	Aground	Fisher Docks	Not stated
Liberta	Feb. 15	Aground	Bolt Head	Total loss
Lighter Stephen	Feb. 18	Collision	Pernambuco	Sank
Lilehorn	Feb. 18	Aground	Vancouver	Rudder
Maridal	Feb. 1	Ashore	Cape Town	Total loss
Maitland	Feb. 4	Collision	River Thames	Sank
Marcato	Feb. 4	Collision	River Thames	Sank
Mira	Jan. 31	Collision	off Oland	Port side
Margari	Feb. 4	Collision	Gijon	Not stated
Montes	Feb. 8	Fire	Buenos Ayres	No. 4 hold
Ma men	Feb. 6	Hvy. weather	off Cape Race	Considerable
Manchester Producer	Feb. 10	Heavy gale	Not stated	Disabled
Michigan	Feb. 15	Disabled	Not stated	Lost prop.
Mary B	Feb. 19	Aground	Apple Island	Not stated
Mystic	Feb. 19	Aground	Spectacle Island	Not stated
Mary R. Mullins	Feb. 26	Collision	City Island	Bow
Mexpet No. 2	Mar. 1	Collision	Everett	Port quarter
Medon	Feb. 16	Ashore	Yokohama	Floated
Nilos	Feb. 1	Disabled	Mitylene	Shaft
New York	Feb. 8	Collision	Galveston	Considerable
Nordborg	Feb. 10	Collision	Not stated	Damaged
Nordkap	Jan. 29	Fire	New Orleans	Not stated
Novelty	Feb. 16	Leaking	Not stated	Total loss
Naparima	Feb. 18	Collision	Not stated	Sank
Nagato Maru	Feb. 24	Collision	Yokohama	Not stated
Olga	Jan. 31	Collision	off Oland	Not stated
Ontario	Mar. 5	Collision	Pauillao	Stem
Oregon	Mar. 7	Collision	Grays Harbor	Leaking
Otta	Feb. 25	Struck chan.	St. George's	Forepeak
Petworth	Feb. 2	Disabled	Not stated	Tailshaft
Porthcawl	Feb. 1	Stranded	Inchcolm Island	Floated
Petersham	Feb. 9	Collision	Hull river	Leaking
Pinto	Feb. 9	Sank	Norwegian Coast	Not stated
Pacific	Feb. 10	Struck sub. object	Portland	propeller blades
Penthaw	Feb. 12	Aground	Buenos Ayres	Not stated
Pinthis	Mar. 3	Fire	Providence	Considerable
Persian Empire	Feb. 16	Ashore	Sandhead	Not stated
Royston Grange	Feb. 1	Struck dock wall	Buenos Ayres	Stern
Ragnar	Feb. 1	Aground	nr. Sandhammaren	Not stated
Reval	Feb. 2	Ashore	Arcona	Not stated
Rendsburg	Feb. 3	Ashore	nr. Blankenese	Floated
Robert Koppen	Feb. 3	Collision	off Newark	Considerable
Raylight	Feb. 7	Collision	off Nash Point	Considerable
Rip	Feb. 7	Collision	off Nash Point	Considerable
Ragni	Feb. 9	Hvy. weather	Not stated	Considerable
Robert L. Bean	Feb. 19	Ashore	n. e. Pensacola	Total loss
Resolute	Mar. 5	Collision	Yokohama	Not stated
Schorarie	Feb. 8	Collision	nr. Altona	Starboard side
Sandholm	Feb. 9	Struck rock	Skien	Leaking
Saint Hubert	Feb. 11	Ashore	off Brest	Not stated
Sandvik	Feb. 12	Ashore	Middelgrunden	Floated
Sada	Feb. 18	Ashore	Fort Lauderdale	Not stated
Suricho	Feb. 17	Aground	Main Channel	Not stated
Seattle Spirit	Feb. 19	Collision	Hog Island.	Port bow
Sokndal	Feb. 20	Ashore	Progreso	Not stated
Spar	Feb. 19	Fire	Portland	Not stated
Sudawsonco	Feb. 20	Aground	Fort Pickens	Floated
Silverbrook	Mar. 2	Aground	nr. Vegesack	Not stated
Sierra	Mar. 3	Fire	San Pedro	Considerabl
Sucrosa	Mar. 7	Aground	Edgemoor	Floated
Seamew	Feb. 14	Ashore	nr. Gluckstad	Floated
Sylt	Feb. 14	Ashore	nr. Brunshausen	Floated
Storfors	Feb. 16	Collided jetty	Charlton	Bows
Scandinavia	Feb. 24	Disabled	Hafringe	Prop. lost
Saru	Feb. 25	Collision	Bosphorus	Forward
Tuxpanoil	Jan. 30	Ashore	Port Newark	Floated
Tingyuan	Feb. 10	Struck rocks	Hankow	lost prop. and rudder
Teeswood	Feb. 11	Aground	nr. Maasluis	Floated
Transford II	Feb. 26	Disabled	East River	Lost prop.
Tento	Mar. 2	Disabled	St. Johns	Boiler
Ulisse	Feb. 1	Hvy. weather	Not stated	Damaged
Velaug	Feb. 1	Touched ground	Vishaes	Bottom
Virginia Dare	Mar. 2	Ashore	Cape Lookout Cove	Lost rudder head
Valcerusa	Mar. 5	Fire	Gloucester	Not stated
Vistula	Feb. 18	Collision	Antwerp Roads	Port side
Wear	Feb. 3	Collision	off Humber	Port side
Wallsend	Feb. 3	Ashore	Hebburn	Floated
West Cawthon	Feb. 4	Fire	Erie Basin	Considerable
West Nosska	Feb. 10	Fire	Not stated	Cargo
Warwick	Feb. 10	Struck sub. object	Not stated	Stern, frame; propeller
Walter B. Pollock	Mar. 4	Collision	Hoboken	Sank-raised
W. C. Kennedy	Mar. 6	Ashore	North Reef	Total loss
Wendla	Feb. 10	Gale	w. Skudesnes	Sprang leak
Westerham	Feb. 19	Aground	Hourdel Harbour	Floated
Yosemite	Feb. 7	Struck rocks	Point Reyes	Total loss
Yser	Feb. 10	Struck dock wall	Bordeaux	Stem
You	Feb. 15	Collision	off Ambrose Chan.	Damaged

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Lundin Life Boats
Saved Crew of Antinoe

Modern Inventions Save Crew

Wireless, Radio Compass and Lundin Lifeboats Enable Rescuers to Reach the Antinoe.

Without the inventions of the twentieth century the crew of the British freighter Antinoe, who were rescued last week by the United States liner President Roosevelt, would have perished.

Lundin Boat Almost Unsinkable.

The Lundin boat, which is still regarded with suspicion by older seamen, is an all metal, broad, shallow life boat, so buoyed up with air tanks as to be almost unsinkable. It cost Capt. Fried of the President Roosevelt six Lundin boats to save the Antinoe's crew. He attempted to use none of the other types hanging on the davits. This is an endorsement so sincere and from such an authoritative source that the Lundin may be accepted universally as the lifeboat for the heaviest seas.

In rescuing the sailors of the Italian freighter Ignazio Florio two months ago Capt. Grening of the President Harding also used Lundins exclusively.

Chief Officer Miller, when he arrived in Queenstown, spoke with unrestrained enthusiasm of the Lundin boat, and one of the Roosevelt's passengers, a veteran of many crossings, insisted that no other type of lifeboat could have lived in the waves between the American and the British liners.

From New York Sun. Feb. 1, 1926.

"THE Lundin boat is an all metal, broad, shallow lifeboat, so buoyed up with air tanks as to be almost unsinkable. Capt. Fried of the President Roosevelt attempted to use none of the other lifeboats hanging on the davits and without the LUNDIN LIFEBOATS, an innovation of the last decade, Capt. Fried might have been forced to stand powerless on the bridge and watch the freighter go down with all hands.

This is a sincere and authoritative endorsement that the "Lundin" may be accepted universally as the lifeboat for the heaviest seas.

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Welin Davit & Boat Corp.

305 Vernon Ave., Long Island City, N. Y.

Then only, far under in the depths of her hold,
Some gleam of its wonder man's eye may behold.
Swinbourne.

EACH beam, each well fitted timber, each sturdy rib and plank strong enough to stand the wildest gale,—and she's tight if properly caulked.

The experienced sailor knows the value of tight seams—no one need tell him that—but thousands of ships on the seven seas assure him that his seams will be *tightest* when caulked with

STRATFORD OAKUM

For almost a century Stratford Oakum has caulked the seams of the finest vessels that sail the seas.

Be sure you get genuine Stratford Oakum. There is no other "just as good."

GEORGE STRATFORD OAKUM COMPANY
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Terminal at Oakland

(*Continued from Page* 34)

and this concern consigns equipment of this nature to all points.

The Boorman Steel Co. has also proven a valuable addition to Eastbay industries, as local manufacturers are afforded an unlimited supply of steel for all purposes by this concern.

The Western Sulphur Co., with an investment of $100,000 is supplying farmers with sulphur for fertilization purposes.

Lack of proper piers and modern facilities for economically transferring cargo from ship to cars or warehouse throttles industrial development. The initiative and progressiveness of the owners of the Parr Terminal should be commended. As a result of this pioneering spirit the community now has an adequate foundation for commercial growth and trade should flourish, which will in turn increase shipping.

Equipment Used

(*Continued from Page* 32)

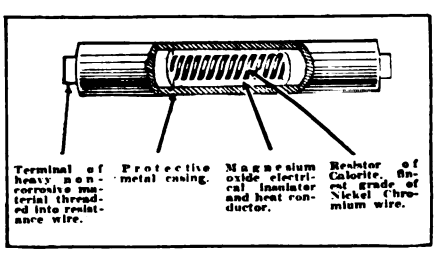
base. This condenser is made of a heavy steel shell with welded steel heads. These heads are drilled and countersunk to receive extra heavy condenser tubes. These tubes instead of being rolled or welded in the ends are threaded and are securely held in place by gaskets and steel lock nuts. High efficiency is obtained in the passing of the cooling water back and forth 13 times in all before final discharge. This type of condenser not only makes for a compact unit but it also minimizes the changes for leaks and makes it easier to repair if necessary. To prevent freezing, the water can be drained from the condenser by opening the petcock in the bottom.

A typical one ton capacity machine of this type for shipboard use would occupy a total floor space of only 35 inches by 35 inches. It is equipped with an automatic control board with a theormostat located in the refrigerator room. The refrigerating equipment will start and stop as the temperature of the room varies. An indicating thermometer with extension tube into the cooler shows the temperature at all times without opening the cooler doors. A part of the equipment may be a 15-gallon galvanized scuttle butt, fitted with a galvanized cooling coil, set in an insulated matched board jacket. There is also a 100-pound ice making set in a galvanized metal jacket thoroughly cork insulated. The overall inside refrigerator space for which this machine would be suitable will measure 5 feet by 5 feet 8 inches by 5 feet 10 inches and the expansion coils in this space are built up of 1¼-inch extra heavy pipe in the proper amount to secure the desired temperatures for the vegetable and meat room into which this space is generally divided.

Unique Heating Element Used in Electric Stove

It isn't strange that electric cooking on board ship should be received with distinct favor in many quarters when the advantages of this type of equipment for the galley are taken into consideration. Some of these advantages are cleanliness, convenience, economy in operation and space, durability, low maintenance cost, safety from fire, better cooking, more ideal working conditions, and a less restricted choice of location.

Perhaps one of the earliest pioneers in developing the use of electricity for cooking was the Edison Electric Appliance Co., Inc., Chicago. The high quality of electric galley equipment as built today by this company is well recognized. The S. S. MALOLO, the most elaborate American merchant ship ever undertaken will be completely equipped with this company's electric ranges, broilers,


Terminal of heavy non-corrosive material threaded into resistance wire.
Protective metal casing.
Magnesium oxide electrical insulator and heat conductor.
Resistor of Calorite, finest grade of Nickel Chromium wire.

bake ovens and griddles. No less than eight ranges and two broilers will be installed in the main galley. The crew galley will be fitted with two ranges and there will be one bake oven in the bakery and one in the pastry room. The coffee pantry, lounge pantry and deck pantry will be equipped with a total of four griddles.

In this particular article, however, we are more concerned with a description of the heating element which is used in this equipment and which is shown in an accompanying illustration. Though extremely simple in principle it has taken the company 16 years to perfect the manufacture of this type of heating element, called the "calrod." As the heating element is undoubtedly the most important part of any electric cooking device its perfection has been much sought after. The new heating element is especially suitable for heavy duty equipment as it can be made an integral part of the cast iron heating plate. The life of the resistance wire in this type of construction would seem to be for all practical purposes without limit. The first experimental units have been in service over 12 years without showing any effects of age or decomposition. Of course this permanence is due to its complete protection from oxidation and from actual mechanical contact tending to injure it. Furthermore the material in which it is imbedded conducts heat so well that it gets but little hotter than its surrounding mediums. With this type of heating element a great heating capacity can be concentrated in a given area and it can, therefore, be readily applied to a large variety of heating devices.

The unit consists of a resistance wire in the form of a helical coil of a single strand, surrounded by insulation which consists of magnesium oxide in a copper or steel tube depending upon its application. The manner of manufacturing is most interesting. In the first place the coil of resistance wire is wound on a high speed arbor and terminals attached in the ordinary manner. It is then placed in the tube, stretched between a tight insulating washer at one end and a specially developed "charging washer" at the other end. By this means the coil is held, stretched in the center of the tube. Magnesium oxide is then introduced into the tube through the opening in the charging washer. It would seem a slow process to fill a tube 4 feet long and ½-inch and less in diameter with dry powder through three openings less than 1/16-inch wide and ¼-inch long. The tube is placed on end with a small hopper containing the magnesium oxide on top and then the tube and hopper are very rapidly vibrated at perhaps 70 vibrations per second. The vibration gets the dry powder through the tiny holes and keeps the coil centered in the tube as it is being filled. It can be readily appreciated that the centering is important in order to have the same insulating resistance on all sides.

After being filled the tube is tightly closed with insulating washers. With the coil held in place inside by the insulating powder the tube is either swaged or rolled according to the use it is to be put to. The rolling or swaging reduces the diameter, increases the length and packs

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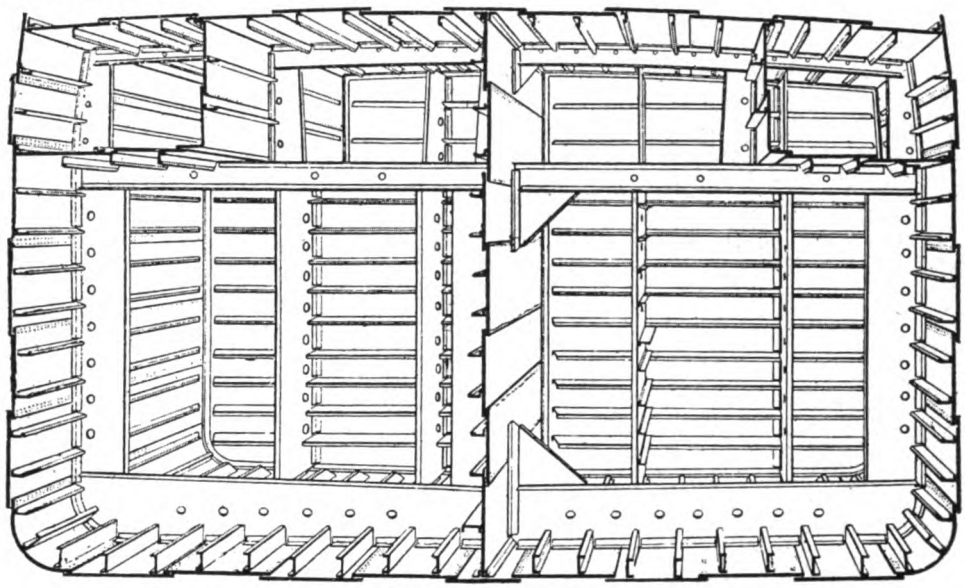
Progress in Oil-Tank Ship Construction

THE "BRACKETLESS—SYSTEM"

(PATENTED)

Eliminates Bulkhead Brackets. Eliminates Bulkhead Leakage. Greatly simplifies construction. Greatly reduces cost of upkeep and cost of damage repairs. Greatly reduces cost of cleaning tanks. Substantially increases the longitudinal strength beyond the well-tried "Isherwood System."



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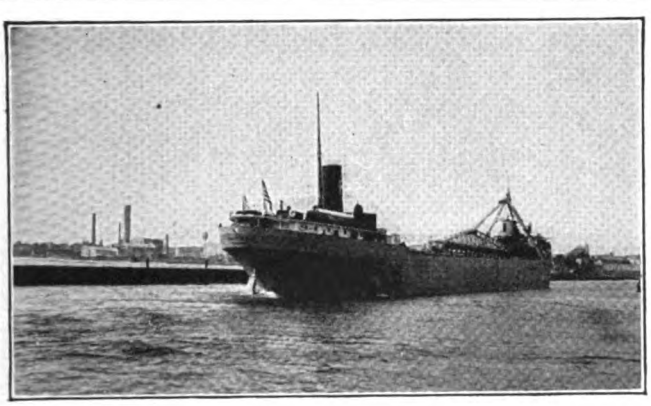
Sir Joseph W. Isherwood, Bt. 17 Battery Place, New York and 4, Lloyd's Avenue, London, E.C. 3



Manitowoc and Ships!

Covering a period of many years, Manitowoc and Ships have been practically synonymous. And Manitowoc Ships are not only significant of high grade, sea-worthy vessels but also carry the confidence and trust that only successful veterans enjoy.

We design and build steel passenger boats, freighters, car ferries, self unloaders, sand suckers, dredges, lighters, tugs, fireboats, dump scows, marine engines and boilers, ship auxiliary equipment, etc.

Let us figure on your requirements.

MANITOWOC SHIPBUILDING CORP.
Manitowoc, Wis.

MANITOWOC

Cargo Handling Equipment

The advertiser has for several years specialized in the design and manufacture of high grade portable machines for handling miscellaneous cargo. One of these is the fastest machine of its kind on the market and in a number of instances has increased the tonnage 100% immediately after installation.

A careful study and analysis of cargo handling over a period of several years and along lines more scientific than anything heretofore attempted enables me to build other machines for handling miscellaneous cargo to and from side-port, hatch and lighter which will reduce the time and labor cost about 50% under the present average.

This equipment is not for sale but where there is sufficient tonnage will install and supervise operations at my expense for a share in the savings.

An American with bank references.

Terminal Engineer, Box 373
Marine Review, 220 Broadway, New York.

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the powder contained in the tube to the hardness of concrete. On the completion of this process the "calrod" unit is practically a solid rod of uniform density and can be further swaged or rolled if desired.

It is this type of heating element cast into castiron cover plates with which all the galley equipment furnished the S. S. MALOLO will be fitted. Furthermore it is now standard equipment for all heavy duty units turned out by this company.

Steering Control Gear for Diesel Ships

Now that electricity has been found to have many advantages over steam for driving auxiliaries aboard ship, operators are rapidly adopting it. The substitution of electricity for steam is even more marked where diesel conversions and new motor tonnages are concerned. In the case of the shipping board conversion program now underway, a great deal of study was given to this subject by the technical staff of the shipping board headed by H. E. Brelsford, and it was found possible to utilize a large part of the old steering engine equipment thus saving a number of thousand dollars per ship. An electric motor will be substituted for the steam steering engine proper, and in the case of most of the ships no alterations to the screw gear or tiller will be necessary.

The Sperry company has helped in this program by developing a special gyro-pilot and dual electric steering system for these vessels. This equipment provides three methods of steering and a change from one to the other may be made at will by simply moving a lever mounted on the side of the steering stand to whatever method of steering is desired. The three lever positions are marked "Gyro," "Wheel" and "Controller."

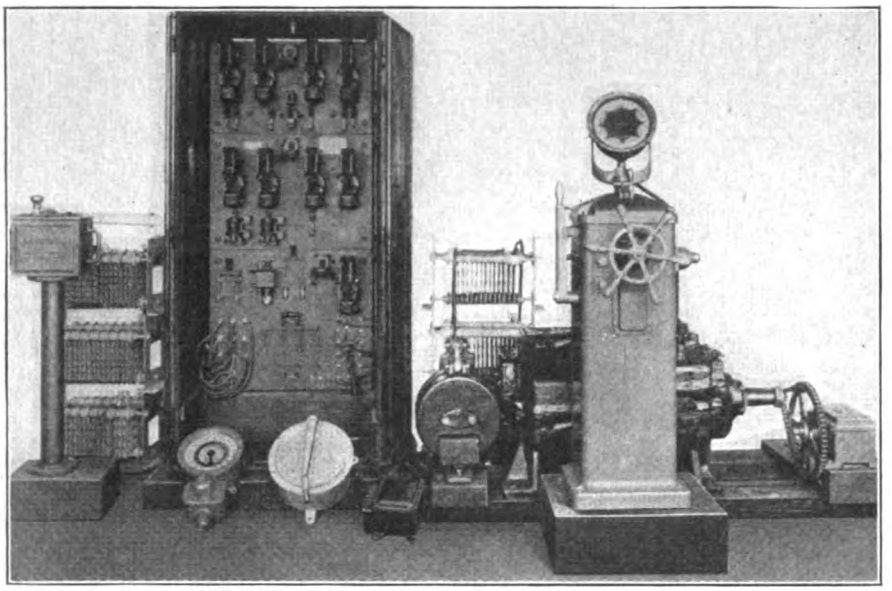
With the lever in "Gyro" position, the ship is steered automatically from the gyro-compass. This system of automatic steering is the same as is incorporated in the standard single unit gyro-pilot now used on over one hundred vessels of all types throughout the world. When steering automatically the wheel on the control unit then becomes a course changer. For example, if it is desired to change the course to starboard, one spoke change of the wheel gives a one-half degree change to starboard, or each full turn of the wheel gives a change in course of about three degrees and so on. It is, therefore, unnecessary to put a man at the wheel when making changes for another vessel or for great circle or other course changes.

When it is desired to bring the ship under the control of a helmsman, the selector lever is moved to "Wheel" and the wheel functions just as any ship's steering wheel and with the usual ratio of three and one-half turns from midships to hard-over.

The "Controller" method of steering is not dissimilar to the system used throughout the United States navy. A controller handle is attached to a square ended shaft protruding through the top of the steering stand. When this controller is in the center position, the steering motor is idle. When it is moved to one side, the steering motor is started and remains running until the controller is brought to the central position or until the rudder is hard over. Bringing the controller back to the central position stops the steering motor. To bring the rudder back amidships, it is necessary to move the controller to the opposite side for a corresponding length of time. In other words, this method provides what is known as nonfollow-up steering and is accomplished through circuits which are entirely independent of those used for "Wheel" and "Gyro" steering.

Both the gyro-pilot dual electric steering control and the main steering motor operate from 230 volts, which is the normal voltage for these ships.

A Sperry self-synchronous rudder angle indicator, operating from this same voltage, is also supplied as part of the steering system. An indicator in the wheelhouse and after steering position shows every degree movement of the rudder up to 10 degrees on a side and every five degrees thereafter. This instrument is of great value in helping the officer choose a setting of the gyro-pilot which will hold the ship with a minimum amount of rudder.



ASSEMBLY OF THE COMPLETE SPERRY STEERING SYSTEM FOR THE VESSELS UNDER CONVERSION TO DIESEL DRIVE BY THE SHIPPING BOARD—THREE METHODS OF STEERING ARE PROVIDED FOR—AN ELECTRIC MOTOR REPLACES THE PRESENT STEAM STEERING ENGINE. HELM ANGLE INDICATORS HAVE ALSO BEEN INSTALLED

A New Cold Metal Saw

An electrically driven, high-speed cutoff saw has been designed by the Hunter Saw & Machine Co., Pittsburgh, with a circular-toothed saw that cuts cold metal quickly, and aids in lowering shop cost by reducing the time of operations. This machine, model No. 1-A, is an improvement over former designs, and is particularly useful in cutting such metals as smaller light section beams, channels, angles, brass, copper, structural and welded tubing, pipe, fence, and fire escape materials, metal moldings, light steel sections and pressed and drawn steel shapes.

The motor and saw blade are mounted on opposite ends of a tilting frame in this machine. When a piece of material is brought in to be cut, it is placed in the machine and held firmly by means of a double-jaw, quick acting, eccentric vise. The machine is then started by means of a push-button-controlled magnetic starter, and the saw, driven by an endless belt from a Westinghouse motor, is fed down through the ma-

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DROP FORGED WELDLESS

EYE BOLTS

ROLLED THREAD
GALVANIZED OR PLAIN

½"	DIAM.	WITH	EYE	⅞"	INSIDE
⅝"	"	"	"	⅞"	"
¾"	"	"	"	1⅜"	"
1"	"	"	"	1½"	"

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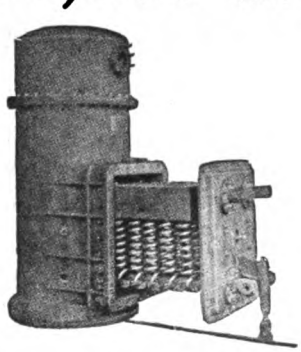
The Evaporator that protects 9,000,000 b. hp.



Bulletin 330 explains why
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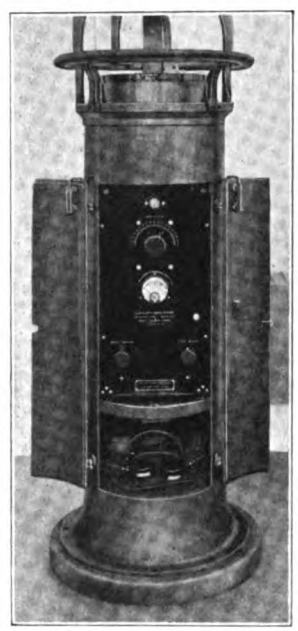
Kolster Compass *participates in 2 sensational rescues!*

A small, compact, simple instrument that performs a big and essential duty. Over 150 vessels have the protection of the Kolster Radio Compass.



A heavy sea—steering wheel broken—and position unknown! That was the predicament of the Italian freighter "Ignazio Florio."

Sinking in mid-Atlantic—position reported approximately 100 miles in error—complete loss seemed to be the fate of the "SS. Antinoe."

But the "President Harding" and the "President Roosevelt," respectively, with the aid of the Kolster Radio Compass, quickly located these two vessels and robbed the sea of its human prey.

Locating vessels in distress is but one feature of the Kolster Radio Compass. Geo. R. Putnam, Commissioner of Lighthouses, considers the radio compass the most important navigational instrument provided for use on shipboard since the invention of the magnetic compass.

Your ships need the protection of the Kolster Radio Compass. Write for bulletin and prices.

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FEDERAL CONTINUOUS WAVE RADIO EQUIPMENT

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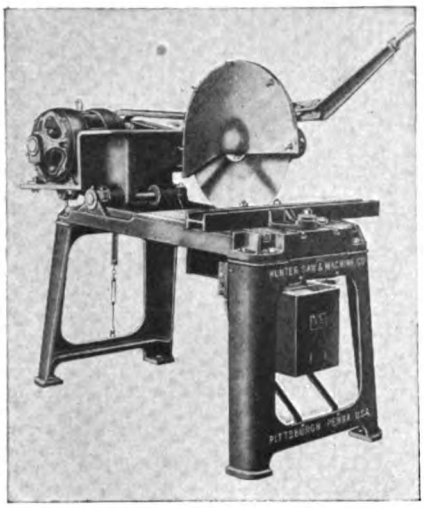
terial, the operation being completed quickly and accurately. A pan, attached to the under side of the table, catches the cuttings and keeps the shop in a neat condition. The table of the machine is provided with a quadrant stop that can be set to any angle within the sweep of the saw blade used.

The proper alignment of the pulleys obtained by having the motor



HIGH SPEED METAL CUT-OFF SAW SHOWING I-BEAM IN PLACE READY TO BE CUT

keyed to the base, the handwheel providing for the convenient belt adjustment, and the lower belt tension provided through a wider belt are other features of the design of this machine.

Adequate protection to the operator is provided by means of steel guards that cover the belt and saw.

Delaware Bridge

(*Continued from Page* 35)

bered that each cable has 18,666 wires, that each is 3540 feet long and weighs 6,750,000 pounds, this task of weaving the cables in place was prodigious. More so, perhaps, when it is realized that the laying of the strands and the weaving of the cable had to be done in such a manner that not a single wire should shirk its strain, thus throwing added burden on another wire.

That this was done, and done perfectly, however, was assured by Chief Engineer Modjeski when he said: "In such work there is always the danger of a wire or two slipping and the accident not being discovered until we come to the squeezing process with the 'traveling spider.' Not one wire, however, has failed to fall into its intended place and the contractor is to be congratulated on the performance of the work of his wiremen. All wires pull together."

The suspender ropes supplied by the American Cable Co. and extending from the two main cables to the floor of the bridge, number 596. These alone have a total weight of 7400 tons. The floor which they support is made of steel and reinforced concrete, there being on it two 10-foot sidewalks, a 57-foot motor drive, two trolley tracks and two rapid transit tracks.

Suspension bridges date back to the obscurity of Chinese history. The first mention of suspension bridges was made by Kircherns in his "China Illustrata" published in 1667 wherein he describes a suspension bridge consisting of 20 chains, which, according to him, had already seen more than a century of service. Among the earlier suspension bridges is the one over the Danube at Budapest which has a span of 666 feet, and the Clifton bridge at Bristol, England, having a span of 702 feet. Both of these bridges, however, are of chain. It remained for Philadelphia, in 1816, to erect the first wire-cable suspension bridge across the falls of Schuylkill thus ushering in a far-reaching development in bridge construction and then to complete what she had started with the erection of the Delaware bridge, which will take its place immediately as the principal factor in the future growth and development of the two cities and surrounding territory.

Recent Sales of Ships

T. V. O'Connor, chairman of the United States shipping board has announced the following sales of government tonnage.

J. M. CONNELLY, SHARON and BESSEMER, steel tankers each of 7057 deadweight tons, to the Atlantic Refining Co., Philadelphia for the sum of $40,000 each, "as is" and "where is," for diesel conversion. At the time of the sale these tankers were laid up at Mobile, Ala. The Atlantic Refining Co. will convert these vessels to diesel electric drive, it is understood, quite similar to the J. W. VAN DYKE, in which three Ingersol-Rand oil engine generating sets were installed for the main motive power which is applied to a single motor driving the propeller.

HAITI, a steel cargo vessel of the deep draft lake-built type to the Columbia Steamship Co., subject to approval by the legal department, for $10,000 cash "as is" and "where is," subject to a five year guarantee of service of nine voyages per annum to the Virgin islands, British and French West Indies, Paramaribo and Dutch Guiana.

World Markets

BERKUT, single deck steamship, 6550 deadweight tons, 4415 gross tons, to French buyers.

FRANCISCA, single deck steamship, 1289 net tons, 2115 gross tons, to Italian buyers.

LAKE FARIBAULT, single deck steamship, 4115 deadweight tons, 2603 gross tons, for $25,000 to Industrie Navali Soc. Anon., Genoa.

MODESTA, single deck steamship, 6250 deadweight tons, 3868 gross tons, for about £30,000 to buyers not stated.

NICOLAOS, single deck steamship, 5955 deadweight tons, 3844 gross tons, for about £16,500 to Greek buyers.

RONDO, single deck steamship, (renamed GLUCKAUF). 2750 deadweight tons, 1906 gross tons, for about £15,000 to Gluckauf Kohlenhandels G. m. b. H., Rostock.

USWORTH, single deck steamship, 3000 deadweight tons, 1985 gross tons to the Nigerian government.

Standardized Building of Harbor Craft

The following announcement was issued recently from the office of Lawrence R. Wilder, president of the American Brown Boveri Electric Corp.

With the award last week, of two contracts aggregating $3,479,000 to the American Brown Boveri Electric Corp., Camden, N. J.; one for 33 patrol boats at $63,000, each for the United States coast guard service and the other for 6 diesel electric ferries at $233,333 each; the corporation named is inaugurating a unique activity in standardized ship building which will be carried on in addition to its established business in built-to-order ships and smaller craft.

In this department there will be designed, built and placed in stock, standardized smaller craft and harbor improvement units under the various classified services beginning with ferries, yachts, car floats, dredges, barges, and scows. The prospective purchaser will thus, in a short time be able to virtually step into the ship yard and pick out the type and size of floating unit he desires and gain at once the advantage of quick delivery, and exact visualization of what he is buying without the beclouding medium of rough sketches and the advantage of one profit manufacture on a production basis available to him now only in the purchase of such every day items as automobiles, motor boats, etc. A great latitude is still retained for the purchaser in a choice of powering details and outside fittings and finish but by the standardization of main parts the best available composite engineering experience is embodied and this without the sacrifice of the ever important factor of price and delivery.

Joins Operating Staff

John Rae has resigned from the Munson line to join the Huasteca Petroleum Co., 120 Broadway, New York City, which is the operating department of the Pan American Petroleum and Transport Co. Mr. Rae is one of the best known tanker men in the country and his many marine friends wish him success in his new connection.

Mr. Rae was with the Standard Oil Co. of New Jersey for several years as assistant to the manager of the marine department and left that organization to join the Tidewater Oil Co. in a similar position. He left the Tidewater Oil Co. two years ago to join the Munson line and has been with them up to the present time.

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